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PROBLEMS IN INDUSTRIAL PURCHASING

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FOREWORD

> Consumption is the sole end and purpose of all production; and the interest of the producer ought to be attended to only so far as it may be necessary for promoting that of the consumer. The maxim is so perfectly self-evident, that it would be absurd to attempt to prove it.
>
> —ADAM SMITH, *Wealth of Nations*, Book IV, Chap. VIII.

> One last complaint, by your leave. You do talk about consumers in marketing research, and you do study them. But the way you analyze and talk about them suggests that you think of them as simply the raw materials out of which good business and good profits are fabricated. You point out that they are emotional in their reaction to sales appeal, that they can be carried off their feet, that often they seem to make a purchase without really making a decision, and can be dominated and sold through trickery, and so on; and these facts, all of them true, you seem ready to accept as fixed and unchangeable, and upon this unchangeable basis proceed to build the doctrine of how consumer ignorance and gullibility and emotion must be solemnly served and respected, and incidentally turned to good account in a business way. This may be practical, and for all I know it may also be quite moral; but one thing it clearly is not—of value to household buyers.
>
> —D. E. MONTGOMERY, "The Value of Marketing Research to Household Consumers," *The Journal of Marketing*, July, 1938.

The two statements quoted above were made with particular reference to the so-called ultimate consumer, but they are, almost without changing a single word, equally applicable to the industrial purchaser. Much has been written about the buying problem of the ultimate consumer, but far less about the purchasing problems of manufacturers. It is with this subject of purchasing by industrial users, considered from the standpoint of the buyer, that the cases in this book deal.

It would be impossible to study a large number of such cases as these on the subject of industrial procurement without coming to certain conclusions as to its objectives and its scope. The following unsupported conclusions, arrived at in this manner, are presented in the hope that they may make somewhat clearer to the reader the viewpoint of the book as a whole.

Industrial procurement within a manufacturing concern has as its objectives: (1) to relieve the various departments of the concern of the responsibility of making available, when and as required, equipment, materials, and supplies of the proper quality and characteristics, thereby enabling the departmental heads to devote their entire attention to the actual operation of their departments, and thus, (2) through specialization, to acquire these items more efficiently than could be done otherwise. The term, properly interpreted, includes the acquisition of such materials not only through purchase, but also by manufacture for a company's own use, and even by barter. Industrial purchasing as a phase of procurement should be considered as a specialized function, primarily because of the peculiar type of knowledge and judgment required (1) to anticipate the requirements of users, (2) to interpret price trends and market conditions, (3) to locate and determine the reliability of sources, and (4) to negotiate wisely with vendors. It is a major function of business, not only because of the large percentage of total outlay represented by such expenditures, but likewise because of the implications that the performance of this function has for the profits of the company through cost reduction, quality control, pricing policies, and customer goodwill.

There is a much wider significance to industrial procurement than that of company well-being alone, for the manner in which these activities are conducted has far-reaching social and economic consequences upon the volume of industrial and commercial activity, the direction that such activity takes, the stability of business enterprise, and the costs of distribution. The connection between "business spending" and the business cycle is intimate and continuous—a fact upon which there is more general agreement than there is upon just what that connection is.

> Census returns from the 210,959 manufacturing (and printing and publishing) establishments of the country indicated an aggregate outlay of $36,683,000,000 for raw and semimanufactured materials (exclusive of fuels) used in these plants in 1929, about 35 per cent of which ($12,676,000,000) was for raw materials alone. . . . About two-thirds (67.3 per cent) of the cost of the crude materials consumed in manufactures went for those produced by agriculture and animal husbandry. . . . Of the raw materials consumed, 82.6 per cent were of domestic origin; the remainder came from abroad. . . . The outlay for materials is the largest single item of cost for the average manufacturer. . . . For

> all manufacturing industries the combined cost of materials, fuel, etc., was 54.7 per cent of the value of output in 1929. . . . Because of the relative importance of material costs and the demand for high-speed production, any prolonged industrial advance would be likely to bring about marked improvement in the selection, care, and use of materials. Furthermore, the fact that they, like machines, are inanimate and controllable as compared with industrial personnel focuses attention on materials as being excellent subjects for the realization of pronounced economies. The materials organizations in industrial establishments, as a matter of fact, underwent a mild revolution in recent years, as attested by the increased number of concerns in which were to be found perpetual-inventory systems, specialized purchasing officials, salvage departments, material specifications, carefully laid out storerooms, and experimental and testing laboratories.[1]

The implications of these facts are just coming to be recognized by business management and by students of business. It is still unfortunately true, as Gushée and Lovejoy said in 1933, that:

> In every organization, large or small, there is a body of opinion which believes that the individual who requires materials or supplies can do just as good a job of buying for the company as can the purchasing department. This is a very natural human reaction. Everyone has had some experience in buying for personal or corporate needs; moreover, there is a very distinct ego satisfaction—if we may borrow a term from modern psychology—in placing an order for goods. The conferring of a favor upon a salesman in the shape of an order makes us all feel a little superior. This makes the act of purchasing a desirable one. It is power—and we all love power.

On the other hand, as far back as 1912, Wesley C. Mitchell wrote:

> In the scheme of modern life, making money and spending money are strictly correlative arts. . . . The vast majority would gain as much from wiser spending as from increased earning. Important as the art of spending is, we have developed less skill in its practice than in the practice of making money. . . . To spend money is easy, to spend it well is hard.[2]

It was with the conviction that this last statement is essentially sound, and consequently that greater emphasis should be placed upon industrial procurement, that the Harvard Graduate School of Business Administration, some ten years ago, undertook organized research in this field, and in the spring of 1932 formally opened a course to election by second-year men.[1] One of the difficulties encountered by those who have undertaken serious study in this field has been, until recently, the lack of definite and penetrating discussions of actual procurement problems. Stuart Heinritz, L. F. Boffey, Edward T. Gushée, Russell Forbes, George A. Renard, Donald G. Clark, Norman F. Harriman, W. N. Mitchell, and others are notable for their pioneering work in this field, and the National Association of Purchasing Agents has distributed a considerable volume of valuable material. But while all these efforts have resulted in a genuine contribution to purchasing officers as well as to management, there is still a real need, especially in educational institutions, for a presentation of purchasing problems from the actual experiences of companies in various industries. The cases included in the present volume are intended in some part to meet this need. Primarily, the purpose of these cases is to provide a basis for discussion; but it is believed that, supplemented by reading material, they provide an adequate foundation for the development of a systematic study of this important function.

---

[1] U. S. Bureau of the Census, *Materials Used in Manufactures: 1929* (Washington, Government Printing Office, 1933), pp. 43–44.

[2] From "The Backward Art of Spending Money," *American Economic Review*, June, 1912.

In using this volume, however, the reader should keep one definite fact in mind, namely, that the material contained herein is designed primarily for use at the Harvard Graduate School of Business Administration. This fact has of necessity determined not only the number and type of cases selected, but likewise the point of view.

Thus, the objective of this volume is not a narrow vocational one, but rather, it is something much broader. Indeed the objective is a twofold one. The first is so to impress upon students the importance of the procurement function that if and when they attain positions of executive responsibility, they may have a more complete and more sympathetic appreciation of its true importance. The second is even more fundamental, namely, to teach men how to think realistically and clearly, to the end that they may reach intelligent business decisions in whatever area they may be operating. True, the cases frequently have, of necessity, somewhat narrow vocational aspects—it could scarcely be otherwise if they are to be actual, concrete, and specific. But it should be borne in mind that such vocational aspects are quite incidental to the main purpose of the instruction.

---

[1] From 1918 to 1921 a course in industrial purchasing was offered, but it was dropped from the curriculum in 1922 and not offered again until 1932, from which time it has been given regularly.

The omission of any discussion of the purchase of goods for resale may call for an explanation. Briefly, there are three reasons for not including such a discussion in the present volume: the first is that this type of buying is covered in courses in marketing and sales management; the second, that the types of problems faced by an industrial distributor are much more similar to those of other middlemen than they are to the problems of the manufacturer who buys for his own use; and the third, that the limitations of space of necessity force some exclusions.

The fact that the cases deal with procurement by manufacturing concerns in the main explains why there are no cases from the field of government buying; why there are practically none of an institutional character; and why the industrial distributor receives no attention except as a source of supply.

Save only in connection with commercial bribery, there are no separate cases dealing with the legal aspects of purchasing, although the thoughtful reader will recognize legal implications at almost every turn; the instructor who wishes to do so can raise such issues practically at will, and the appended bibliography contains a number of references which may be used in this connection.

There is no separate treatment of purchase budgetary problems or of price forecasting. The explanation of this seemingly serious omission lies not in any failure on the part of the author to recognize the great importance of these problems, but rather in the fact that practically every student in the School meets them in other courses; consequently, under the pressure of time, such material has been omitted from this particular collection of case material. The bibliography, however, does contain a selected group of references upon which the interested student may draw.

A glance at the table of contents will indicate the general order of presentation. This order differs substantially from that found in the first edition by the addition of two new sections (those dealing with manufacturing as an alternative of purchase and with the procurement of equipment), by the rearrangement of the cases retained from the former edition, and by the addition of new material. The new cases that have been added deal particularly with the relation of purchasing to the problem of quality control, with the disposition of scrap, with reciprocity, with forward buying, and with the measurement of performance. Twenty-four of the cases found in the first edition have been omitted from this one, and forty new ones added, making a total of eighty-seven as against seventy-one in the earlier volume.

Space limitations forbid giving individual credit to all those who have made this book possible. The author is deeply grateful for the cooperation of the many industrial executives who have given so unsparingly of their time, and without whose assistance this volume obviously could not have been written. Appreciation should also be expressed both to the officers, past and present, and to the members of the National Association of Purchasing Agents for the encouragement and help that they have so freely given. There are few parallels in the history of trade association efforts for the far-seeing campaign of real education conducted by that organization.

The author also wishes to express his very real appreciation for the research assistance of Mr. Lawrence O. Paul, and for the suggestions and help, editorial and otherwise, of Miss Helen Eastman.

HOWARD T. LEWIS.

SOLDIERS FIELD,
BOSTON, MASS.,
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SECTION I

NATURE OF THE PURCHASING FUNCTION

1. SCOPE OF THE PURCHASING FUNCTION

In 1935 the National Association of Purchasing Agents, through its Committee on Purchasing Department Organization and Procedure, undertook an investigation of the operations of industrial purchasing departments.[1] In response to questionnaires sent out by the Association, valuable information was secured from the purchasing agents of forty-five companies, subsequently classified as "fifteen large, fifteen medium, and fifteen small companies." On the basis of these data an effort was made to define "the extent of those responsibilities which become, by the nature of things, the inherent and exclusive task of the purchasing function." The following material is taken in part from the published results of the study.

EXHIBIT 1

External Activities of the Purchasing Department by Type of Activity

	Responsibility		
	Full	Partial	None
In at least one external activity	100		
Checking of invoices	75	25	
Material and inventory control	55	13	32
Incoming traffic control	39	25	36
Stores control	49	3	48
Receiving of materials	43	4	53
Inspection and testing	27	17	56

The first task undertaken was to determine how extensively the duties of the purchasing department, irrespective of its size, were "limited to actual purchasing" and how far the department was responsible for certain other "external" activities. Exhibit 1 lists the results in terms of ratios to the total number of replies received.

---

[1] The results of this investigation were published in November, 1935, as N.A.P.A. Pamphlet No. 22, *The Scope of the Purchasing Function*, by Erwin H. Schell, Professor of Business Management, Massachusetts Institute of Technology.

In response to a request for "comments on what you consider the scope or duties of a purchasing department," the following illustrative replies indicated that complete uniformity of opinion did not exist among purchasing agents.

> [1] The duties and scope of the purchasing department for a high production manufacturing company should be limited to actual purchasing, and other duties incidental to this work should be handled by the receiving, inspection, and stores and inventory control departments. . . .
>
> [2] In general the purchasing department should be charged with those duties which . . . form a continuous chain in the procurement of supplies from the receipt of the "Requisition on Purchasing Agent" to the delivery of the materials at the plant or construction operation in good order and the approval of invoices for payment.
>
> [3] . . . the traffic, inspection, stores, and expediting departments were all under the jurisdiction of the general purchasing agent. I accepted the responsibility for the material from the time we received a requisition until it was withdrawn from the stores by the shop or field. I firmly believe that this is the best system for handling the purchases with a concern of any size, and that the organization should consist of a director of purchases, with assistants in charge of purchasing, stores (and inventory), traffic, and inspection under him.
>
> [4] The scope of the duties of a purchasing department can never be standardized for the reasons before mentioned (size, character, location, and policy). Another variable which will always have to be considered is the individuality, personality, ability, and training of the purchasing agent.

The next step in the analysis was:

> . . . to establish three groupings of manufacturing companies which could be classified with reasonable certainty as large (2,500 employees or more), moderate in size (500 to 2,500 employees), and small (less than 500 employees). The average ratios of responsibility in allied areas (receiving, inspection and testing, storing, material

EXHIBIT 2

External Activities of the Purchasing Department by Size of Company

	Responsibility		
	Full	Partial	None
Large companies (15)	22	15	63
Medium companies (15)	33	20	47
Small companies (15)	64	16	20

and inventory control, traffic, and auditing of invoices) were then determined for each group. (See Exhibit 2.)

The compiler then added the following comment:

> . . . When we examine into the nature of the work undertaken by the purchasing agents in the small companies, we encounter such varied titles as the following:
>
> Secretary-Treasurer
> Director of Purchases and Stores
> Secretary
> Assistant Secretary and Treasurer
> Superintendent
> Vice President
>
> which points to the fact that in some instances small size permits responsibilities not only to cover allied material functions, but finance or production as well. In other words, one man may be the executive head of several distinct functions.
>
> . . . . . .
>
> Thus it becomes clear that the responsibilities of the purchasing function may require, in the larger organizations, a considerable enlargement of subordinate personnel. But these comments throw little light upon the precise relationships existing in these large companies between purchasing, receiving, inspecting and testing, inventory control, and traffic. Are there officials bearing other titles who coordinate these activities as does the purchasing agent in certain of the smaller organizations?

Additional data were requested from medium-size and large companies in an effort to throw some light on this problem. It was found that of the purchasing departments of the 14 medium-size establishments responding to this subsequent request, 11 reported directly to a coordinating executive, this term being applied "to those major executives (such as presidents, vice presidents, and general managers) whose responsibilities are primarily coordinative in nature." In the 14 companies, traffic reported directly to the purchasing department in 4 instances, inventory control reported in 6, stores in 7, testing in 3, inspection in 4, and receiving in 7. In general, in companies in which these activities were not a responsibility of the purchasing department, such activities were the responsibility of production, except in the case of traffic, which in 4 of the 14 companies reported directly to the coordinating executive and in 3 to the selling division.

Of the purchasing departments of the 15 large establishments responding to the subsequent questionnaire, 14 reported directly to a coordinating executive. In the same 15 companies, traffic reported directly to the purchasing department in 1 instance, inventory control reported in 4, stores control in 4, and receiving in 5. In the large establishments, as in those of medium size, these activities, when not a responsibility of the purchasing department, generally reported to production, except in the case of traffic, which in 10 of the 15 companies reported to a coordinating executive, and in 3 to selling. In none of the large companies did either testing or inspection fall under the supervision of the purchasing department.

The pamphlet then presents the following "four tendencies" as having been established by the information obtained from the second questionnaire:

> First, the high ranking of the purchasing department. In only one instance in each group does the purchasing department report to other than the coordinating executive.
>
> Second, as the establishments increase in size, allied responsibilities of purchasing tend to be shouldered by the production division. This tendency applies to the functions of receiving, inspection, testing, and stores.
>
> Third, in the larger establishments, the traffic function increases in importance, tending to report to the coordinating executive rather than to the purchasing or other departments.
>
> Fourth, while the evidence is not great, there is indication that inventory control tends, in the larger companies, to seek committee control rather than departmental supervision.
>
> . . . . . .
>
> In answering the question which prompted the second questionnaire, we may say in general there appears to be no single executive in the larger companies who directly coordinates purchasing, receiving, inspection, testing, stores, inventory control, and traffic. Instead, the functions of receiving, inspection, testing, and stores, when not under the control of the purchasing agent, are characteristically coordinated under the executive who has charge of production. This executive is of equal but not superior rank to the purchasing agent and traffic manager. Coordination of purchasing, traffic, and production, together with other functions, such as finance and marketing, is effected by a higher official who may have the title of president, vice president, or general manager.

Having summarized the factual findings and in part interpreted them, the writer of the pamphlet then attempted to define the proper limits of the purchasing function as a basis for determining whether or not a particular activity should properly be considered a part of purchasing. The following excerpts are taken from this section of the discussion:

> Clearly then, the problem of scope is not one of attaining recognition, for rank has been readily granted. On the contrary, it is this high status which dictates the scope of the purchasing function. Indeed I am convinced that here lies the key to the principle upon which may be based all decisions with respect to scope.
>
> When is it proper to give a high rank to an industrial function? The answer turns on the fundamental fact that industry is inherently made of human stuff. Those functions which report to the higher officials as a matter of natural right are those which enjoy intimate and exclusive relationship with some distinct and important group of individuals to whose interests the company directly administers. The sales executive enjoys this relation to the customers who constitute the company's market; the financial executive likewise to the fiscal interests, the production executive to the operating employee group, the technical executive to the creative, scientific, and engineering group. The purchasing agent enjoys this relation to that inescapably essential group,—the vendors or suppliers of the company's material requirements.
>
> It is this specific body of contacts peculiar to the purchasing function that entitles the executive to a place in the higher coordinative zone.
>
> Such privilege is accompanied by corresponding obligation. The purchasing agent, to justify his rank, should maintain strong command over company-vendor relationships. When he has shown such competence in these areas that general officials to whom he reports place implicit confidence in his technique and judgment, then he has attained the fullest scope of his stated and implied powers. In some of the smaller organizations it is possible for these standards to be reached, still leaving time and energy for other activities.
>
> . . . .
>
> *Serialized procurement*—An attractive proposal for enlarging the scope of the purchasing department has been to extend the control of purchasing over allied activities until all functions of procurement, from the receipt of purchase requisition to the delivery of the materials on the production floor, should fall under the jurisdiction of the procurement officer, as the purchasing agent might then be called.
>
> . . . .
>
> The purchasing agent whose department is sufficiently large to justify the employment of specialized buyers is freed from much routine. Is he not in proper position to supervise allied departments, and assume the position of procurement officer?
>
> No matter how large the purchasing department, the prime responsibilities of its chief are negotiating rather than executive. He should be the man who personally conducts the most important and delicate

negotiations. He should be in position to give freely of his time for these activities and to go where negotiations may best be conducted.

The greatest hazard confronting the "procurement officer" is that in his zeal to coordinate the work of several departments he may not attend to his major task, and may ultimately find that it is another's judgment which decides important questions of purchasing policy and another's personality and authority upon which important vendors rely.

. . . .

The closest possible coordination between the activities of related departments is always desirable. And such coordination should be equally high throughout the entire sequence of operations from the purchase of raw materials to the delivery of finished goods to the customer. To isolate, for especial coordination, that forepart of the sequence relating to procurement is to assume a divided unity which does not exist in the process of manufacture.

It is the prime responsibility of the general manager to coordinate this entire sequence. With adequate facilities in the form of budgetary control, manufacturing schedules, and the like, together with the cooperation of his subordinate executives in charge of major functions, satisfactory coordination is possible under this general executive.

The notion that the procurement sequence is entitled to especial coordination is characteristic of the period in which production was assumed to dominate manufacturing policy, including not only procurement, but sales. Today and tomorrow it is clear that the ultimate market is the final dictator, and that the complete manufacturing process from vendor to customer must be coordinated as a unit so that it may be brought into harmony with the ever-changing requirements of the consumer.

Applying this doctrine to specific activities:

[1] *Receiving of incoming materials and supplies*—Company-vendor relationships are strengthened when the purchasing division receives and verifies quantitatively the incoming materials and supplies which it has purchased. Conversely, difficulty and loss result when the purchasing division does not at some time have supervision over the physical objects which it has procured.

[2] *Inspection and testing of purchased materials*—Here we are considering the determination of quality. Quantity inspection or checking is normally the responsibility of the receiving function. Vendor-company relationships are strengthened when quality determinations, where practicable, take place in the receiving department under the surveillance of the department head. But these activities should be under the control of the general inspection division of the company which also is commissioned to maintain quality standards for work in process and finished product.

Despite proper specifications and agreed-upon methods of measuring quality, the results of inspection form a fertile basis for friction between vendor and company. Standards may be maintained with least loss of goodwill if the purchasing department, in returning a shipment, is in position to deal impersonally with the situation. Such procedure does not entail the avoidance of responsibility. Rather is it the acceptance of objective and dissociated judgment of qualified experts.

[3] *Material and inventory control*—Vendor-company relationships are strengthened when the procurement executive is in position to collaborate in decisions regarding material and supply inventories. A vendor sells delivery, as well as form and substance. And delivery is directly affected by inventory control. When the vendor appreciates that he will be given opportunity to be of fullest service in point of delivery, as well as price and quality, his sense of affiliation with company interests will increase.

But the purchasing agent cannot expect exclusively to control material inventories, for productive financial and marketing considerations should have equal weight in deliberations.

[4] *Stores*—Assuming the procurement function to have active voice in matters of material inventory control, vendor-company relationships will not be strengthened by purchasing jurisdiction over the stores department. Indeed, the stores function, viewed as a physical facility (storing and issuance), is almost entirely a service activity in behalf of production, and its mismanagement bears most heavily, if not completely, upon productive activities. Therefore, by the nature of things, its administration rests with the operating division.

[5] *Incoming traffic*—Strong vendor-company relationships require that the procurement division lay down suitable specifications concerning the transport of incoming materials. Such specifications should be qualitative rather than determinative. That is to say, after the relative requirements in terms of speed, safety, and cost have been outlined, the methods of meeting these requirements should be determined by the traffic department. The traffic manager, like the purchasing agent, has intimate and exclusive relationships with the carriers and should therefore report to a general official. The data reflect this tendency as the size of establishments increases.

[6] *Checking of material and supply invoices*—Vendor-company relationships are strengthened when the purchasing division approves payment of invoices. That the buyer shall pay is a rule of trade as old as commerce itself. The purchaser, as company representative in the transaction, should remain such until the transaction is completed, if best trade relations are to result. Such approval of payment is based on a verification of the invoice as a result of comparisons with purchase order and receiving record. That such evidence may accompany the approved purchase order for subsequent audit by the

comptroller does not lessen the justification of invoice approval as a purchasing activity. The checking of mathematical extensions is a specialized routine which may be performed by the purchasing, accounting, or financial divisions depending upon clerical resource and fitness.

[7] *Activities complementary to purchasing* . . . Another possibility for allied activity lies in the sales of scrap or waste products. Where sales are made to vendors, trade relationships may be strengthened through purchasing control, and the routine becomes not only permissable but obligatory upon the purchasing agent. Where sales of waste products are allied with product markets, it is equally clear that the sales department should perform these duties. Where sales are related neither to vendor nor to market, the sales department should logically supervise unless specific reason can be found to the contrary.

2. NATIONAL SURVEY OF INDUSTRIAL OILS AND GREASES[1]

In 1930, and again in 1937, the research department of McGraw-Hill Publishing Company, Inc., of New York City, conducted a nation-wide survey on the marketing of industrial oils and greases. Both surveys were conducted by questionnaires filled in during personal interviews.

The number of such interviews conducted in the course of the 1930 survey was 1,216; in 1937 it was 1,428. The men from whom information was sought included, among others, administrative executives, production and operation executives, plant service and maintenance men, and purchasing officers. The percentage in each classification varied somewhat as between the two years. Thus, of the total number in 1930, 15.1% were administrative executives; whereas in 1937, 23.3% were in this group. Again, in the former year, 32% were purchasing officers; in 1937, 16.7% were so classified.

After the data obtained in 1937 had been assembled, tabulated, and analyzed, the newspaper service bureau of the McGraw-Hill company released the following news bulletin, which was printed in many newspapers and trade journals:

> New York, Oct.—A study of industrial oils and greases, just completed by the research department of McGraw-Hill Publishing Company, shows many important trends since the first survey of this market conducted by the same company in 1930. Seven years ago price was the controlling reason for purchasing a brand in 34.1% of the cases studied; today "dependable quality" is the most important reason, "manufacturer's reputation" second in importance, "delivery service" third, "test" fourth, while "price" was fifth in rank.
>
> This shift in reasons for the selection of one brand over another has resulted in important changes in the types of men who participate in buying. The purchasing agent, according to the survey, has declined in importance perceptibly from 66.5% in 1930 to 27.7% in 1937. The replies in over 4,000 case studies indicate that the trend to buy more on quality and less on price in the oil and grease field has much to do with bringing the higher executive into greater prominence as a participator in buying. He was found to be in this group in 48% of the plants in 1930; today he is in this group in 52.5% of the plants.
>
> The tremendous increased volume of industrial advertising is reported to be responsible for selling industry on buying more on quality

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[1] Made by McGraw-Hill Publishing Company, Inc., in 1930 and 1937.

and service, less on price. Engineers and executives are now taking a greater interest in lubrication and in buying lubricants. Following through on research and education, 50.3% of the firms questioned stated that they had reduced costs through use of better oils and greases.

The use of all types of oils and greases is definitely upward. This trend is due partly to increased production, and partly to increased mechanization and to the greater use of oils in certain fields, such as diesel fuels, diesel lubricants, and aviation lubricants.

The following exhibits present some of the findings of the McGraw-Hill company resulting from its 1930 and 1937 surveys on the marketing of oils and greases.

EXHIBIT 1
Reasons for Brand Preference
(1930 and 1937)

	1937	1930
Number of transactions studied	4,322 = 100%	1,186 = 100%
Product characteristics:		
Viscosity	13.3%	9.2%
Volatility	6.3	1.9
Flash point	8.5	3.7
Fire point	6.8	2.9
Cold or pour test	5.9	3.3
Base	3.5	3.8
Reclaiming properties	2.6	
Color	2.3	
Carbon residue	....	3.3
Consumption	....	4.8
Other characteristics	....	7.1
General characteristics:		
Test	30.1	39.5
Engineering service	19.7	14.2
Reciprocity	25.7	16.0
Discounts	2.0	0.5
Lower price	22.2	31.4
Good salesman	5.3	6.1
Recommendations of machinery builders	8.7	5.1
Dependable quality	70.5	
Delivery service	33.7	
Friendship	9.6	
Credit	2.1	
Manufacturer's reputation	34.0	
Investments	....	1.6
Bankers	....	0.1
Outside influences	....	3.7
Price per production unit	....	1.9
Other price reasons	....	0.7
Other reasons	9.6	12.7

NOTE: In this and the following exhibits the omission of figures for either 1937 or 1930 indicates that the data were not requested in that year.

EXHIBIT 2
Source of Purchase
(1930 and 1937)

	1937	1930
Number of transactions studied	4,777 = 100%	1,186 = 100%
Source:		
Direct	76.9%	81.3%
Distributors	19.0	15.2
Both	1.0	
Service stations	2.6	
Direct and service stations	0.1	
Other	0.4	3.5

EXHIBIT 3
Who Participates in the Buying of Oils and Greases*
(1930 and 1937)

	1937						1930
Number of transactions studied	Type: 4,631 = 100 % Make: 4,583 = 100 %						654 = 100 %
	Specifies		Approves		Decides		
	Type	Make	Type	Make	Type	Make	
Function:							
Administrative executives	12.0 %	19.6 %	26.3 %	36.0 %	34.4 %	42.4 %	48.0 %
Production and operation executives	18.9	17.8	21.0	18.4	22.6	20.9	56.7
Plant service and maintenance executives	19.5	17.3	18.5	15.5	11.8	9.8	40.6
Operators and users	4.3	3.4	3.3	1.9	0.8	0.8	3.5
Purchasing agents	7.4	16.5	15.5	21.1	17.9	21.9	66.5
Others	8.7	5.1	4.0	2.8	3.4	2.8	5.2
Sales and advertising executives	0.1	0.4	4.2	7.0	0.6	0.5	
Engineers	20.1	12.7	15.0	9.7	11.3	6.9	
Foremen	13.7	7.4	8.4	4.7	5.2	2.9	
Electrical plant service	......	......	......	......	......	......	13.5
Mechanical plant service	......	......	......	......	......	......	39.1
Chemical testing	......	......	......	......	......	......	11.9
Production engineering	......	......	......	......	......	......	2.4

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* The figures for 1937 were obtained in answer to two questions: "Who participates in the selection of the TYPE of oil?" and "Who participates in the selection of the MAKE of oil?"

EXHIBIT 4
Reasons for Preference of Source*
(1937)

	Direct	Distributors	Both	Service stations	Direct and service	Other
Number of transactions studied	3,462 = 100 %	835 = 100 %	42 = 100 %	124 = 100 %	4 = 100 %	17 = 100 %
Reasons:						
Delivery service	57.9 %	59.2 %	71.4 %	16.1 %		
Engineering service	19.7	14.9	45.2	6.5	....	23.5 %
Price	36.4	15.2	45.2	10.5	....	47.1
Credit	1.0	4.1	33.3	15.3		
Reciprocity	25.4	12.2	33.3	18.5	100.0 %	
Friendship	6.2	19.3	....	31.4		
Company reputation	32.4	29.0	50.0	25.0	....	64.7
Other	9.0	15.6	2.4	35.5	....	11.8

* No comparable information is available for 1930 survey.

The following reports which were written by two McGraw-Hill field agents participating in the 1937 survey give general opinions relative to industrial oils and greases.

REPORT OF FIELD AGENT "A"

These opinions are discussed under four factors: (1) Selection of Type of Oil, (2) Selection of Make of Oil, (3) Source and Method of Purchase, and (4) Value of Publication Advertising and Direct Mail Literature.

Selection of Type of Oil.—In the average plant insufficient thought has been given to the selection of the type of lubricant for a particular purpose. Oils and greases are, in many instances, used interchangeably with apparently little regard to the varying efficiency and operating costs of the machine when so lubricated. This condition is particularly prevalent in small plants using small quantities of oils and greases. It is not uncommon to find heavy, slow-moving parts lubricated with the same grease which is used in small machines which are operated at high speeds. The reason for the prevalence of this condition is probably that the annual grease and oil expenditure is small in these plants, and the plant executives do not wish to have money invested in a number of types of lubricants which are not used often.

Even in plants using large quantities of lubricants, the selection of the type to be used is left largely to the engineers or maintenance men, who do not give individual lubricating problems particular attention. My observation has been that only in those plants where oil companies have surveyed the equipment and made specific recommendations are the proper types of lubricants used. Needless to say, many plant managers will not allow oil companies this freedom. When oil companies suggest that surveys be made they are informed that company engineers are capable of specifying the proper types of lubricants. Some companies which were contacted had allowed surveys to be made, but were not following the oil company's recommendations. The one company interviewed which did follow the recommendations of the oil company was of the opinion that the proper type of lubricant was being used in all equipment, so lessening upkeep and depreciation costs as well as grease and oil costs.

Selection of Make of Oil.—In most cases the products of the leading oil companies are considered of equal quality. That is, most engineers, purchasing agents, and plant executives feel that any one of the large oil companies has a product which is suitable to the particular needs of their plant. Similarly, for the same grade of oil there is found to be little if any difference in the price quoted by the oil companies. Since immediate delivery can be had from nearly all companies, the reason for the selection of the make of oil is usually friendship and reciprocity. Someone high up in the management of the plant wishes to throw his business to a personal friend or concern with whom he does business, and specifies the make of oil that is to be used. The selection of the make of oil used can, in some cases, be traced to aggressive selling, but this is the exception rather than the rule. Few oil salesmen call on the average plant, probably because of the small quantities of lubricants used. The usual procedure in purchasing oils and greases is for the engineer to requisition the type of lubricant needed and the purchasing agent to call the oil company or distributor whom he has been asked by his superiors to patronize.

In branch factories the men in charge of the branches usually have no voice in specifying either the type or make of lubricant used. The engineers in the home office specify the type of lubricant to be used and the company executives specify the make used. The oil companies' salesmen call only at the home office, and the branch managers are, in many cases, entirely ignorant of how lubricating problems are attacked. As the central office usually forbids its branches to give out any information, salesmen who do call at these branches not only are unable to make a sale, but also are unable to gain any information that is of value in making a sale at the central office.

Source and Method of Purchase.—The source of purchase depends largely on friendship and reciprocity. In fact friendship or reciprocity, which determines the source, automatically determines the make of lubricant used. If any definite line can be drawn between the source picked because of reciprocity and the one picked because of friendship, it can probably be said that the distributor supplies the oils and greases when friendship is involved, and the oil company supplies those whose purchase is the result of a reciprocal arrangement.

There are some instances in which the oil company has been able to underbid the distributor. In these cases the oil company is awarded the contract unless there is a reciprocal agreement with the distributor. In no case has there been any dissatisfaction with the delivery service of either the oil company or the distributor.

Also, there are cases in which the oil company is able to give engineering service which is of value to the purchaser. When this service is needed, the oil company rather than the distributor is allowed to supply the oil.

Companies using large quantities of oil nearly always have an annual contract with the oil company or distributor. A lower price is made when purchasing on contract than when no contract has been signed. Though the smaller plants seldom have such contracts, they ordinarily buy the same make of oil year after year and are supplied by the same source unless the service becomes unsatisfactory or reciprocal arrangements make it advisable to purchase elsewhere.

Value of Publication Advertising and Direct Mail Literature.—The publication advertising of oil companies has been found of little value in helping plant managers with specific lubricating problems. In fact it is only seldom that a man will admit that the publication advertising of an oil company has had anything to do with his selection of that make of oil. However, this does not mean that the publication advertising is worthless. Many of the men interviewed have said that they expected to see advertisements of the oil companies whose products they were using. All of them have felt that the advertising which they had seen had been generally helpful and had made them conscious of lubricating problems which otherwise might have been discredited if not entirely overlooked.

The direct mail literature which is received seldom gets any attention. The usual answer to the question, "Which oil companies have sent you direct mail literature this year?" is "Oh, several," "I just throw it in the waste basket." On further questioning it is found that these men do not remember which oil companies sent out the literature.

Conclusion.—It is concluded from this brief analysis that the oil companies themselves must recommend the types of lubricants to be used. This program can probably best be put across through the distributors who are personal friends of the executives in companies which they supply. If annual contracts are desired from the users of industrial oils and greases, it will be necessary to make some price concession. However, because of reciprocal agreements and friendship with many dealers, it is doubtful if price concessions could be made attractive enough to induce the small plants using only a few barrels of oil per year to sign an annual contract.

In advertising their products in technical publications, oil companies might do well to suggest specific types of oil for specific purposes, but in general publications, institutional advertising is considered more valuable. Unless the information obtained in this part of the survey is not a representative sample, I would suggest that direct mail literature be discontinued.

REPORT OF FIELD AGENT "B"

The purchasing habits of companies in respect to oil may be divided into two groups, the first group, those that use large amounts and pay special attention to their purchases, and the second or small group that pays little attention to oil purchases since it is such a small factor.

The usual pattern followed by large companies is to purchase by yearly contract direct from the oil company. There seems to be little reason for the direct purchase other than that the size of their purchase warrants it.

In the selection of brand and type of oil, maintenance men and regular shop workers may play a rather important part in selection through a suggestion plan. They are in close contact with oiling problems and machine wear. They notice unusual wear and suggest a different type or brand of oil or grease. They may receive credit, but it is doubtful whether this would appear in answers of executives who have final authority and are led to believe that they initiated the change.

Another important aspect of purchasing in large companies is that they maintain general laboratories and have different brands and grades of oil tested before purchases are made. I also believe that an important reason for purchasing is custom. Companies have used one brand of lubricants for years; they have had satisfactory results and would not change for even a big price concession.

An important aspect that I have noticed where there are several mills or factories, or where operations are spread over large areas, is that the selection of type and brand of lubricant is left to the judgment of the individual factory manager or machine operator.

I also gained the impression that reciprocal buying and purchasing is increasing. Many companies believe it is the best way of doing business while others do not approve it.

The small companies pay little attention to their oil purchases. They use such a small amount that it would not pay to test. Small companies are inclined to use oil recommended by a friend or buy a brand that is said to be good in a trade journal. They purchase in very small amounts, and it is usually from a distributor.

In all cases, it appears that salesmen can do little to sell their products. Companies either have settled on one brand which they will use until it proves unsatisfactory or else they buy purely from a standpoint of price, in which case the lowest bidder gets the contract. In other words, the only time when a salesman has a chance to get a new customer is when a person becomes dissatisfied with the product he is using. This makes it difficult, for salesmen must reach the company at the exact time the oil proves unsatisfactory. Another difficult situation is found where there is central purchasing, yet specification of brands comes from individual mill managers or machine operators.

There is a conviction shown among the purchasers, that all oil companies put out products of similar grade. They discount sales stories of salesmen as being of little truth. They have had satisfactory relations with their present source and, since the claims of superiority of competing salesmen are discounted, they believe that they will get better service and price by sticking with their old source of supply.

The business of the small companies amounts to so little that the oil companies do not call on them. They are left to their own devices and no salesman attempts to influence their choice.

In answering the questions on advertising, the executives were unanimous in saying that this played no part in helping them to select their brand of oil. They could not say which company had the best advertising. However, most executives had some opinion on which company had the best reputation. In all cases they would not answer the reputation question, but it was apparent that they had preferences. For this reason, I believe that the institutional type of advertising would be more effective. I believe this is borne out in the statement of several men that the competitive advertising done by the oil companies is a pure waste of money.

I reached the conclusion that the men appreciated the magazines on lubrication more than any other type of advertising. The magazine is useful, and although little time is given to reading it except where articles touch the executives' business, yet it is the one that is appreciated most.

The savings of companies that have been effected through oil are usually classified in three groups. The first and most important is through better lubricating devices. These include enclosed bearings, pressure lubrication, and other of the modern improvements in lubricating devices. The second largest savings have been accomplished through the introduction of reclaiming devices. These take the form of removing foreign matter from oil, reclaiming engine oil, and putting filters on air and refrigerator compressors. The last type of saving is through the better quality of oil produced now. In all these cases, repairs, etc., have been materially reduced.

Small companies pay little attention to savings that may be accomplished through the better handling of their lubrication problems. The savings would be so small that they appear to the owner not worthy of investigation.

I do not believe that the engineering service of the oil companies is used as effectively as it might be. In my estimation, the companies are too liberal and their return is small. All large companies have had at least two in the last several years. The companies should try to make the engineering service more of an obvious favor rather than usual service. Companies may find ways of reducing costs through this service and yet they prefer to continue to do business with the old company. The service does not create the goodwill that it should.

One place where the service is used to advantage is where a company lets a contract to supply all oil and grease to one oil company. The engineering service makes a survey of the plant, specifies type of oil, and the contract is awarded to the lowest bidder.

I gained the impression that the companies that I visited had absolutely no interest in specifying the type of oil and grease that should be used in their machines. It is probable, however, that this situation resulted from the fact that only one manufactured a standard line of machines. They concluded that it would not be worth while to make an individual study of each machine to determine its special oil and grease requirements.

I also gained the impression that users of equipment followed manufacturers' recommendation as to type and brand until it proved unsatisfactory. This shows that there is a large field for the oil companies to develop.

In my opinion, the figures and information given were accurate. The companies made a genuine effort to cooperate. The questions of opinion on the best oil, grease, reputation, etc., were not answered for business reasons. They were afraid the information would be divulged, even with the assurance of absolute secrecy. The survey, in my opinion, is accurate, and although some figures for oil are in totals, the answers are reliable.

3. GINN AND COMPANY

CENTRALIZATION OF PURCHASING FUNCTION

In October, 1925, the executives of the Athenaeum Press of Ginn and Company had under discussion the advisability of establishing a centralized purchasing department.

Ginn and Company had been founded in 1867 by Edward Ginn. Its activities included the publishing of college, high school, and elementary school textbooks, as well as book printing and binding. The business was organized as a partnership which was extended to executives in key positions as they proved their worth. In 1925 there were 18 partners: 1 was manager of the editorial department; 2 were in charge of accounting and finance; 14 were in charge of sales districts; and 1, the production manager, was in charge of manufacturing, which was centered in the Athenaeum Press located in Cambridge, Massachusetts.

The organization of the Athenaeum Press consisted of four divisions: composing, press, bindery, and finished stock and shipping. Each division was managed by a specialist in his field who had been in the company's employ for many years. The managers of the composing, press, and bindery divisions were skilled craftsmen who took pride in their work. The division managers had their own offices and clerical forces. They approved all purchases made for their divisions and supervised the necessary purchasing routine except in the case of paper, which was purchased by the production manager.

Total purchases for 1924 exceeded $1,000,000, half of which represented paper purchases; other items included factory supplies, ink, glue, bindery supplies, shipping supplies, wax, chemicals, printing-plant equipment, fuel, power, and metal for type and book plates.

Each division of the Athenaeum Press, so far as purchasing was concerned, was an independent unit in the business. Under this system there was duplication in buying the many supplies which were common to all divisions. Even within a division, purchasing was not always confined to one person but was sometimes done by any individual responsible for the use of particular materials or supplies. The vendors' salesmen entered the plant, sought out the person or persons responsible for the use of their products and, if possible, secured orders. There was no uniformity in the quantities ordered, no standardization as to brands or grades, and no regulation as to the quantities to be used over a period of time. Control of stores also was decentralized. Each division was responsible for the supplies used in that division and maintained its own storeroom.

This decentralization in purchasing and stores control carried with it several disadvantages. The difficulty that the accounting department experienced in ascertaining the division responsible for checking specific invoices meant delays, which resulted in the loss of cash discounts. Another disadvantage was the difficulty encountered in securing information, for the purpose of accounting and statistical control, as to the quantity of materials on order or in stores. The lack of such information often resulted in a shortage of some materials and in an excessive stock of others. Under the proposed plan of purchasing, a centralized system of purchase records would be maintained.

If a purchasing department was established, it would be necessary to select a purchasing officer. The executives considered three possibilities: the paper buyer could be given the new duties and thus have all purchasing under his direction; an experienced purchasing officer could be brought in from outside the company; or some member of the organization other than the paper buyer could be given the position.

Executives of the company believed that the establishment of a centralized purchasing department under the direction of the paper buyer offered some real advantages. Since he was the production manager, he was familiar with all parts of the organization and knew the materials that had to be purchased. Because of his established authority, the four division managers would be less likely to resent their loss of authority over purchasing than if the position was given to someone else. Furthermore, it was likely that his function of coordinating the various divisions would simplify control over purchasing and over stores. Finally, his past experience in buying would be helpful to him.

On the other hand, the production manager had sufficient duties under the existing organization to require his full attention. If he assumed, in addition to these, a function as important as purchasing, he would have to delegate some of his other duties to a subordinate or appoint a subordinate to assist him in purchasing.

The production manager, furthermore, should not be burdened with the detail necessitated by the installation of proper records.

If an experienced purchasing officer was brought in to head the new department, he would be able to install the necessary records and would know the routine of dealing with salesmen. If his experience had been gained in the book publishing or printing field, sources of supply of the various products and materials would be familiar to him.

Such an appointment, however, would present some disadvantages. A new man would not know the various members of the organization, and he might not coöperate with the division managers. It might be impossible to get a purchasing officer with publishing or printing experience. Under an experienced man, furthermore, the department might be developed too rapidly to permit harmonious adjustments within the company.

If a man other than the production manager was taken from the existing organization, someone with experience would have to be obtained to install a system of records and methods for centralized control. Purchasing routine, purchasing practices, methods of dealing with salesmen, and the sources of supply would have to be learned by the man given the position. A trial-and-error method would be one of the principal means of learning the duties of the new position, and only a very able man could survive under such a system. A poor selection made in the beginning might result in the discrediting of the purchasing department before it had had an opportunity to prove its value.

On the other hand, the appointment of a man from the organization would have certain advantages. His past record would be available and his capabilities known. He would be familiar with the organization and would know the several division heads personally. The growth of his work would be slow at first and would be the result of gradual acquisition of the knowledge necessary to perform properly the duties of purchasing officer. Such a transition would, however, lead to the harmonious establishment of a purchasing department, as there would be no sudden divorcing of authority from the division heads.

4. REXBURG MACHINERY COMPANY

DIVISION OF PURCHASING RESPONSIBILITY

The Rexburg Machinery Company manufactured machine tools. All purchases of materials and supplies except castings were made by the purchasing officer; castings were bought by officials of the production department. Castings comprised 90% of the weight, from 50% to 60% of the number of pieces, and 80% of the cost of materials used in the manufacture of the company's products. Because the purchasing officer believed that the procurement of castings should be a function of his department, on two occasions he brought the problem of castings purchases to the attention of the general manager.

Purchases of the Rexburg Machinery Company embraced about 90 classifications of commodities, including such items as acids, adhesives, bearings, belting, brushes, castings, chemicals, electrical goods, heaters, lumber, machinery and tools, pattern supplies, rubber, steel, nonferrous metals, bakelite, hospital supplies, and office supplies. Each of these classifications included several subdivisions.

Purchases were made in response to requisitions which originated with either the balance of stores clerk or the foreman of an operating department. On these requisitions were described the materials or supplies desired. Usually the descriptions were not sufficiently complete to be used on the purchase order, and the purchasing officer therefore was forced to supply additional information. His usual sources of information were the records on file in the purchasing department, suppliers' catalogues, and his own experience covering a period of over 10 years. In addition, the purchasing officer made frequent trips through the company's plant in order to keep informed as to the types of machinery which were being manufactured. Blueprints were available currently for his examination. For example, a typical requisition from an operating department requested the purchasing officer to buy "24 washers as per blueprint 702." After examining this blueprint, the purchasing officer changed the requisition to read "24 washers ½" × 1" × ¼" of S.A.E. #F1 hard white felt."

The purchasing officer usually ordered the quantities indicated on the requisitions. If a considerable saving was possible from increasing the quantity, however, and if the quantities of the particular commodity purchased in the past indicated that no excessive stock would result, he increased the quantity to the amount required to effect the saving. For example, a requisition from an operating department called for 25 springs of a certain type. Upon investigation, the purchasing officer found that the 25 springs would cost $2.10, while double the quantity would cost only $3.58. His purchase records revealed that in 1937 the number purchased had increased to 50 over the 25 purchased in 1936, and that 50 had been purchased in the first six months of 1938. He therefore ordered 50 springs instead of the 25 requested on the requisition.

After checking description, quantity, and other information given on the requisition, the purchasing officer approved the requisition, which was then used as a basis for filling out the purchase order. The description of the materials or supplies desired and all the information in regard to quantity, price, routing, and terms were duplicated on the purchase order.

In addition to requisitions and purchase orders, all invoices were submitted to the purchasing officer for approval after he had examined prices, discounts, and terms. Quantities indicated on the invoice were checked against the receiving slips by the accounting department.

Throughout this purchasing routine, the purchasing officer had considerable freedom of action. For most classifications of commodities he was free to buy from any sources of supply which could furnish the materials desired, and he carried out all negotiations with suppliers. He interviewed most salesmen or, if desirable, made arrangements for interviews between a salesman and engineering or production officials of the Rexburg company. In any event, he usually participated in the final selection of suppliers and in the determination of price. Such details of the transaction as terms, shipping dates, routing, packing, and labeling were all his responsibility.

Although, with the exception of castings, the purchasing officer issued all purchase orders, in the case of electric motors the problems of what to buy and where to buy were to a large extent decided elsewhere than in the purchasing department. In the purchase of electric motors, company policy dictated the selection of one brand almost to the exclusion of other makes. Because the motors which were used embraced a wide variety of sizes and types, the Rexburg company did not stock any quantity of them and was therefore dependent upon prompt shipments from a near-by manufacturer. As the selection of motors for a machine was a highly technical function, certain of the company's electrical engineers interviewed most of the salesmen selling motors and motor controls, selected the motors to be purchased, and arranged for shipments either with the salesmen verbally or by telephone directly with the executives at the motor manufacturer's plant. The purchasing officer was usually informed of these arrangements by the requisitions which were sent to him from the engineering department. These requisitions noted such pertinent information as the name of the supplier, the description of the equipment ordered, prices, terms, and the shipping date promised. The purchasing officer then sent a purchase order to the supplier to confirm the verbal agreements. Occasionally, however, the engineering department carried through such purchases without notifying the purchasing officer, and when he received the invoice, he could find no record of the purchase. Under such circumstances the invoice was referred to the engineering department for checking prior to payment.

The purchasing officer had been unable to eliminate this practice until early in 1938 when a shipment based on one of the telephone orders was delayed. Because the purchasing department had no record of the transaction, it had not carried out its usual routine of following up delayed shipments, and the engineering department, therefore, had to assume that responsibility. Usually the engineering department might have performed this task without a great expenditure of time, but in this instance the supplier had mislaid its record of the order, largely because the Rexburg company had not sent a confirming purchase order containing an identifying number. After this experience, although the engineering department in emergencies continued to telephone orders, with rare exceptions it notified the purchasing department before placing the order, so that the number on the confirming purchase order could be used to identify the telephone order.

In addition to these two commodities, there were others over which the purchasing officer's control was limited to some extent; usually the only limitation was that members of his department did not interview all salesmen representing the Rexburg company's usual sources of supply. In each case, however, the purchasing department was expected to interview the salesmen representing companies from which the Rexburg company was not buying. These commodities were as follows: (1) office machinery, furniture, and equipment; (2) maintenance supplies and power plant equipment; (3) machine tools; (4) tools and tool supplies; (5) painting and polishing materials; and (6) welding supplies and equipment.

The procurement of castings, however, was carried out entirely independently of the purchasing officer. Castings were made of cast iron, steel, malleable iron, aluminum, brass, and bronze. Two tons of castings a day were required when the company operated at normal capacity, and the employment of from 100 to 150 workers was dependent upon the prompt and regular delivery of this quantity. As the machines manufactured by the Rexburg Machinery Company were all of special design, the company could not stock a supply of castings in anticipation of requirements. If a supplier delayed shipment or if the company was obliged to discard some castings because they were found to be defective when machined, a shortage of these essential parts would result, with a consequent disruption of the production schedule. Maintaining production schedules was of primary importance because it was the practice of the Rexburg company to promise its customers shipment by a definite date.

Of equal importance was maintenance of the quality of the castings. As the Rexburg company itself made the patterns used in the manufacture of the castings and furnished them to its suppliers, the foundries were responsible only for the following: (1) handling the patterns without damaging them; (2) making the molds accurately; (3) properly preparing metal of the specified analysis; (4) pouring the castings so that no defects, such as blowholes, shrink holes, or sand holes, would occur; and (5) trimming the castings of excess material. Even if actual defects were not present, castings of poor quality would result in excessive cost of machining to the Rexburg company.

Because of the importance of prompt shipments and high quality, the superintendent of the production department of the Rexburg Machinery Company directed the purchase of castings. Most of the negotiations with the foundries, however, were carried on by two of his subordinates, the foreman of the pattern department and the head of the planning department. As soon as a machine was ordered into production, these officials made arrangements for the delivery of the castings needed. The foreman of the pattern department examined the blueprints of the machine to see what new patterns, if any, were required to make the castings. Patterns that could be reused were usually already in the possession of the foundry which was best equipped to make the castings. After consulting the head of the planning department, the foreman of the pattern department then arranged with the foundry for deliveries of castings at times which would enable the Rexburg company to meet the tentative production schedule. The foreman of the pattern department generally played the most important rôle in conducting negotiations with the foundry, but, as the production schedule was conditioned upon the delivery of the castings, the other official closely followed the negotiations and frequently participated directly in discussions with representatives of the foundries.

For purchases of castings a requisition form was used as both requisition and purchase order. As a rule the officials who purchased castings carried out all arrangements and negotiations with foundries without consulting the purchasing department.

The purchasing officer was opposed to this method of buying castings because he believed that through experience the purchasing department, not the production department, was best fitted to deal with suppliers. The purchasing department was constantly endeavoring to purchase at the lowest prices which could be obtained without sacrifice of quality and service. The production department, on the other hand, was primarily concerned with achieving a more rapid rate of production. Furthermore, checking deliveries was part of the normal routine of the purchasing department; its tickler files were arranged so that purchase orders were followed up systematically. Moreover, for about a year just prior to his appointment as purchasing officer, his work had involved arranging for prompt deliveries from the company's casting suppliers. At that time he had been commended for his success at this task. The purchasing officer failed to see wherein he had since become incapable of doing this work. He believed, furthermore, that if he were unable to serve the production department promptly, the company should acquire the services of a purchasing officer who could do so, rather than divide the purchasing function.

The officials of the production department, on the other hand, believed that castings should be purchased by the individuals who knew them best and that referring such matters to the purchasing department would involve extensive intercompany correspondence which would result in delays in obtaining requirements. They believed that the decision as to which of the usual foundries should be the source of supply for certain castings was determined more by the character of the castings than by questions of price. Each of the foundries which were the company's principal sources of supply for castings was particularly well adapted, by the nature of its equipment and the skill and experience of its workers, to produce certain types of castings. The selection depended chiefly upon (1) the kind and quality of the metal and (2) the size and intricacy of the castings. From experience the production department knew, for example, the one foundry that was best fitted to produce intricate castings and, as a result, all really difficult shapes were purchased from this particular foundry. Another foundry was able to pour castings rapidly and at low cost; consequently, when the Rexburg company needed a large quantity of relatively simple castings, this foundry was the logical source of supply. In addition to knowing which foundries were best equipped to produce the various types of castings, the pattern department foreman had to keep informed as to operating conditions at the foundries. If the foundry best equipped to make a certain casting was already operating at capacity, the foreman of the pattern department might have to procure the castings from another source of supply. However, by taking the matter up personally with executives of the foundry, he was usually able to work out a satisfactory arrangement.

Selecting the source of supply was, therefore, a matter of simple routine for the foreman of the pattern department, who had had long experience in analyzing patterns and in studying the casting problems involved. If a casting was found to be defective, this official could take immediate action to prevent production delay by instructing the foundry to pour replacements at once.

In 1930 the purchasing officer first brought the question of castings purchases to the attention of the general manager and thereafter continued to urge a change in the purchasing procedure for castings. Finally, in 1935, the general manager wrote a letter to each of the officials concerned, in which he stated that purchases of castings would continue to be handled by the production department but that "all deals with the foundries supplying castings should be made in collaboration with the purchasing officer, so that he may know of and approve the price we are paying and may be in a position properly to check such prices from time to time."

The purchasing officer attempted to conform to these directions by endeavoring to keep informed on negotiations with suppliers of castings in order to have adequate information for checking invoices. He found, however, that officials of the production department continued to buy castings virtually as before, to the exclusion of the purchasing department. Early in 1936, therefore, he again brought the matter to the attention of the general manager.

The general manager arranged for a conference which was attended by him, the head of the planning department, the superintendent of production, the foreman of the pattern department, and the purchasing officer. The superintendent of production and the purchasing officer agreed to issue a written statement which reiterated most of the ideas presented in the general manager's letter but indicated definitely that the procurement of castings was to be done cooperatively by the superintendent of production, the pattern department foreman, and the purchasing officer. It was agreed that the foreman of the pattern department was to order specific parts from the foundries he considered best equipped to make them, but in cases of poor quality or service or other complaints, changes in sources might be suggested by the superintendent of production. The purchasing officer was to be kept fully informed on all arrangements with the foundries and on all complaints arising from relationships with the foundries, so that he would have sufficient information to analyze existing sources with a view to suggesting changes which might result in lower prices or better service. All foundry salesmen were to be interviewed in the purchasing department. Furthermore, the purchasing officer was given the right to suggest changes in ordering routine which would aid his records and permit consideration of possible savings in the purchase of castings before such purchases were made. The proviso was added, however, that the suggested changes must not be of such a nature that they would delay deliveries of castings. Finally, a record of arrangements with foundries was to be sent to the planning department.

Notwithstanding this agreement, which was drawn up in January, 1936, castings continued to be procured by the foreman of the pattern department with the cooperation of the head of the planning department, almost to the exclusion of the purchasing department. The purchasing officer was supposed to check invoices and was prepared to do so when he had available information on which to base his judgment. As, however, he seldom was informed about the purchase of castings, he examined castings invoices but did not initial them. He did buy malleable iron castings, as the volume of these purchases was so slight that no other official was interested.

Despite the existing situation, the purchasing officer in 1938 was still convinced that the purchasing department should be the center of all procurement activities. He believed that only this department consistently maintained the attitude of questioning the adequacy of all suppliers, all products, and all prices. If a product performed satisfactorily, members of the production department were not likely to spare, from their consideration of really pressing problems, sufficient time to analyze alternative products.

A situation which had arisen in 1937 illustrated the purchasing officer's idea of the proper function of the purchasing department. Early in that year the production department ordered 120 sets of three stainless steel castings from a certain foundry. Each set of three parts weighed 400 pounds and cost $1.17 a pound. As usual, negotiations were carried out and the order was placed without reference to the purchasing department. When the purchasing officer received the invoice for the sets, he immediately sent for the blueprints to find the reason for what appeared to him to be an unusually high cost. After examining the blueprints, the purchasing officer was convinced that a saving in purchase cost would have resulted if the sets had been manufactured by machining and welding bar stock. He did not have the technical knowledge necessary to suggest the design changes which would have been required, but after his complaint the methods department developed a new design composed of six parts which could readily be made from bar stock. It was then found that five sets of the new six-part design could, in the future, be bought for the cost of two sets of the three-part design that had actually been purchased. In addition, each set of six parts could be made five times as rapidly as each set of three castings. The purchasing officer believed that the savings could have been realized on the original purchase if he had been informed of the purchase in advance.

5. SAGE PAPER COMPANY

DISCONTINUANCE OF PURCHASING DEPARTMENT

The Sage Paper Company manufactured stationery, writing tablets, and greeting cards. Its operations consisted of cutting, folding, designing, printing, and boxing the finished papers that it purchased, as well as the manufacture of the boxes themselves. The company's total annual purchases exceeded $700,000. For over 20 years all purchases of supplies and raw materials had been transacted by the company's purchasing department. Late in 1937, however, the management was considering the desirability of eliminating this department.

Prior to 1925 the company's sales had consisted largely of high-quality writing paper. One of the first to pack stationery in attractively styled boxes, the company was noted for the variety of textures and styles of paper used in the manufacture of its stationery. In the early 1920's, in order to tap the market for low-cost writing materials, the company added a low-price line of stationery. The company began designing and manufacturing greeting cards in 1924. By 1930 more than half the company's annual sales of $2,000,000 were realized from its line of greeting cards, writing tablets, and low-price stationery. During the period 1930 to 1934, the company became increasingly dependent on greeting cards, and by 1935 this line alone represented half the company's sales volume.

Most of the raw materials and supplies used in the manufacture of stationery and writing tablets were staple items. Methods of drawing up specifications and describing the quantity, quality, composition, weight, finish, and texture of papers used in these two lines were standardized throughout the paper industry. For papers that were available from a variety of sources, the Paper Makers' Association published standard price sheets. Even when a paper was of such a special finish or texture that it was available from only one source, prices were based largely on the published price list.

The manufacture of greeting cards, on the other hand, required special papers and inks. These materials were purchased largely on the basis of samples submitted by suppliers' salesmen. Whereas the materials used in stationery represented 40% and in writing tablets 55% of the respective manufacturing costs of these lines, the materials used in greeting cards represented about 20% of the cost. Twelve months in advance of actual sales and delivery, samples of new greeting cards were submitted to the largest buyers in the trade and tentative orders were received, which indicated the reaction of the trade toward the various items. On the basis of these initial orders the company estimated sales of each type of card and built up its finished stock accordingly.

Until 1930 the purchasing officer had complete charge of purchasing, including the selection of sources and the arrangement of prices and terms. Paper represented 60% of the materials purchased. (See Exhibit 1.) The control of raw material inventories was also under the jurisdiction of the purchasing officer. No purchase orders were valid unless issued by his department, and no invoices were paid until he had approved them. He interviewed all salesmen. It was also his responsibility to arrange for the sale of scrap, which annually amounted to $25,000.

Purchase requisitions for materials were received from the balance of stores clerk. They were checked by the purchasing officer to determine whether (1) a slight increase in quantity might not bring a more favorable price, (2) the specifications clearly denoted the quality he believed was desired, (3) the proper supplier had been selected, and (4) the price, terms, and routing were correct. The basis for his decisions was his detailed knowledge of the markets and his long experience with nearly every available supplier. He was free to buy from any supplier and could change quantities at his discretion so long as there were sufficient raw materials available for the factory at the time specified on the requisition. Also he was held responsible when excessive

Exhibit 1
Sage Paper Company
Materials Purchased, Expressed as Percentages of Total

	%
Paper	60
Paper board	10
Cartons and cases	10
Inks, gums, chemicals	5
Glassine envelopes Cellophane Binding materials Blotters Shooks	15

inventories resulted from his increasing the quantities given on requisitions.

Purchase requisitions for supplies were received from a department foreman after they were approved by the factory superintendent. Though not compelled to do so, the purchasing officer usually adhered strictly to the items, specifications, prices, and suppliers given on this type of requisition.

Inventories of raw materials used in the manufacture of greeting cards were kept at a minimum. Since each card was salable for but one season, it was unwise to order more than the estimated requirement for a particular production order unless a good saving might result in case larger quantities were bought. Materials used in the manufacture of stationery and writing tablets, on the other hand, were controlled by maximum-minimum inventory limits set by the purchasing officer. Stationery also was enough of a style item so that inventories had to be watched with a view to avoiding obsolescence of materials.

The finished stock inventory of each of the company's three lines—stationery, writing tablets, and greeting cards—was controlled by the manager distributing that particular line. When a finished stock of an item needed replenishing, the manager in charge of the line of which the item was a part authorized production requisitions which were translated into production orders.

In 1930 a standards department was organized to determine standard cost figures for materials, labor, and burden. The balance of stores clerk and the finished stock records clerk were moved to this department to facilitate access to raw material prices and inventory figures. The company had been operating at a loss for one year, and it was hoped that this change might effect some savings.

At this same time the control of raw material inventories was removed from the jurisdiction of the purchasing officer and placed under the managers of the company's three lines. The standards and production departments furnished pertinent information and recommendations, but final authority was in the hands of the managers. It was expected that the new setup would provide closer coordination among raw materials on hand and on order, work in process, and finished goods.

After 1930, as the company became increasingly dependent upon its sales of greeting cards, the styling and designing of the line became a more important function. The designers interviewed salesmen; examined and selected samples of papers and ink; selected the best of the drawings submitted by outside artists; developed appropriate sentiments; and determined the size, shape, and method of folding the card. The results of the designers' work were analyzed by a design committee, composed of the chief designer, the designer who had developed the card under discussion, the manager of the greeting card line, and the president of the company, who was primarily interested in sales. This group selected those cards which were to be included in the company's line of samples.

By 1934 the purchasing officer found that in purchasing materials for greeting card manufacture his decisions were largely being made for him by the designers and the design committee. Approximately 30% of the paper and 50% of the supplies purchased by the Sage company were used in the manufacture of greeting cards. About 35% of the salesmen calling on the company were selling materials for use in this line and were therefore going directly to the designers. Although usually the purchasing officer was not informed concerning the details of the discussions and arrangements between the salesmen and the designers, he did try to keep informed about the materials selected and the prices agreed to. The purchasing officer recognized that the problems of design were outside his province and that such decisions had to be made by experienced designers. Furthermore, he still interviewed the salesmen who called on the company selling materials for the stationery and writing tablets lines. Because of his long experience and many friendships in the trade, the purchasing officer continued to be the company's most authoritative source of information concerning sources and prices of raw materials, particularly paper.

In 1934 the company was still operating at a loss. During the previous 21 years it had not been free of bank loans at the end of its fiscal year, and for the past 6 years the total losses sustained amounted to $750,000. The company's banking connection recommended for the position of comptroller a Mr. Hartley, who had for 12 years been employed in the treasurer's office of a large textile manufacturer. After interviewing Mr. Hartley, the owner of the Sage company appointed him comptroller of the company.

Upon taking office, Mr. Hartley examined all phases of the company's operations, particularly checking all cash expenditures and operating costs. As a result of this examination, Mr. Hartley was convinced that inventory control was a chief source of trouble. Since nearly 50% of the shipments to customers were made in the months of October, November, and December, the company necessarily was forced to carry a large stock of finished goods during the second half of the year. Throughout the remaining nine months the company could expect only limited cash receipts. As a result the company depended upon bank loans for its operating capital during much of the year. Mr. Hartley expected to reduce the company's bank indebtedness by reducing raw material and finished goods inventories. He checked finished goods stock in two ways: (1) He eliminated all items that had not sold in some volume, even though in many instances this action involved a considerable loss. On the first "closing out" list that he prepared there were over 100 classes of items. (2) Two or three times a week he examined perpetual inventory records of the principal types of finished goods that were in stock and reviewed the decisions of the individual managers in regard to amounts ordered into production.

Equally important to Mr. Hartley was the problem of raw material inventories. He believed that they should be supervised by someone who was in a position to know production and sales commitments. Mr. Hartley therefore directed that all purchase requisitions be forwarded to him for approval. Whereas this procedure did not require a great change in actual purchasing routine, it did decrease the responsibility of the purchasing officer. The flow of purchase requisitions continued to be from the balance of stores clerk to the purchasing officer. The purchasing officer, however, checked the prices and routing and also examined the materials specifications to see if they would be clearly understood by the supplier. He then transmitted the purchase requisition to Mr. Hartley for approval.

Before approving and returning the requisitions to the purchasing officer, Mr. Hartley examined them in great detail. First of all, he checked the price and supplier. Through exhaustive study since entering the employ of the Sage company, Mr. Hartley had acquired a thorough knowledge of the prices and markets for the principal commodities that were purchased by the company.

Although the practice of the industry varied, he believed that in most instances prices given on standard price sheets could be followed with reasonable assurance that they represented the current market. For example, paper prices were the base prices set by the Paper Makers' Association, plus design, style, size, and quantity extras.

Second, Mr. Hartley examined the delivery date requested on the requisition. He checked this delivery date to determine whether it was in accord with the sales needs of the company and whether the factory department in which the material was to be used would be ready for it. If either of these inquiries revealed that delivery had been requested for a date earlier than necessary, it was his policy to ask for a delay in shipment. In this way raw materials moved more promptly into production.

Third, Mr. Hartley examined the terms of payment given on the requisition. If the terms were 2/10 net 30, Mr. Hartley usually let the requisition go through without comment. If the discount offered was 2% 10th of the following month, he placed orders, if expedient, so that the material would be received during the first 10 days of a month, thereby extending the discount period by approximately 30 days.

Though 1937 sales were $300,000 larger than in the previous year, total raw material and finished goods inventories were reduced over 30%. Also, since Mr. Hartley had taken charge, the Sage company had been entirely free of bank loans on December 31 for the last four years. Sales of greeting cards had grown to represent about 50% of the company's total sales, the remainder being divided between about 30% for stationery and 20% for writing tablets. Mr. Hartley in December, 1937, recommended to the directors that writing tablets be discontinued; and it was voted to liquidate this part of the business by the end of the year, since for 10 years no profit had been made on this line.

In December, 1937, Mr. Hartley and the president of the Sage company were convinced that it was no longer necessary for the company to operate a purchasing department. As already shown, little discretion had been left to the purchasing officer in purchasing materials for manufacture of greeting cards. The personnel of the purchasing department had gradually decreased until the purchasing officer was the only individual left in the department. It appeared to Mr. Hartley that the actual purchasing decisions were currently being made by the designers and managers of each department. Also, the balance of stores clerk was believed to be in a position to know, from Kardex files, from his experience in handling requisitions, and from information given him by the designers who interviewed the salesmen, the proper suppliers and the most economical quantities to buy. Terms, prices, suppliers, and deliveries were already being checked regularly by Mr. Hartley. The discontinuance of the purchasing department would save the Sage company the purchasing officer's salary of about $3,000 a year. Because of his title, furthermore, the purchasing officer was receiving much correspondence in regard to shipments, terms, invoices, and new products which should more properly have gone directly to someone else. In many instances salesmen still called on the purchasing officer, although he no longer made the actual decisions. Mr. Hartley and the president, therefore, saw no reason to continue the purchasing department.

When informed by the president and Mr. Hartley that after January, 1938, the company would no longer need his services, the purchasing officer argued that there was still a need for a central clearing house for all information in regard to purchases. He could furnish information as to where a certain type or finish of paper might be obtained. Furthermore, on the basis of contacts in the trade, he often received advance information on style trends, which was of value in product designing. Though this information might be passed on immediately, the department would have done its duty in acting as a collecting agency. He pointed out also that unless a potential or actual supplier had an intimate knowledge of the Sage company, such a supplier would not know whom to contact in the absence of a purchasing officer.

6. UNITED STATES RUBBER COMPANY (A)

CENTRAL PURCHASING DEPARTMENT AS A GENERAL SERVICE DEPARTMENT

As the result of a reorganization of the United States Rubber Company in the closing months of 1928, a plan was adopted to decentralize the operating departments of the company. In accordance with the provisions of the new plan of organization the general purchasing department was to be placed, together with several other departments, in a group to be known as general service departments. The operating departments would have access to the facilities of these several departments but would not be required to use them.

The United States Rubber Company, one of the largest rubber manufacturers in the world, produced practically every type of product requiring rubber in its fabrication. Some of the leading products of the company were tire tubes and casings, tile flooring, clothing, footwear, hard rubber goods, household articles, mechanical goods, packing, belting, molded goods, plumbers' supplies, and sporting goods.

Before 1929 the company operated 25 manufacturing plants scattered from Boston to Chicago; a foreign subsidiary with plants in Canada and England; and in the East Indies, the largest rubber plantations in the world under American ownership. In general the various factories specialized in groups of related products, but in a number of cases there was duplication of facilities. The growth of the United States Rubber Company had come about largely through consolidations, and it was only natural that each plant had wanted to continue manufacturing a full line even though certain of its products could be produced more efficiently in other factories.

World-wide distribution of the company's products was obtained through company-owned subsidiaries, direct sales branches, branch stores, dealers, and agents. Sales for 1929 were $193,000,000.

Before January, 1929, the company was operated as an organization with highly centralized administration for all departments. All manufacturing was carried on under two major departments: the tire department and the general department.

The operating executives of these two units were located in New York City.

Purchasing for all plants was fully centralized in the general purchasing department located in New York City. Except in an emergency, no plant could make any purchase directly from a supplier or place an order directly against any contract for requirements without obtaining the consent of the general purchasing officer. Each plant was supposed to have a local purchasing organization, but in actual practice the duties were so largely of a clerical nature that they were assigned to some individual who also performed other work. In some cases the storeskeeper was the local plant purchasing officer.

Under this method of procedure the general purchasing department bought 95% of all the company's requirements of materials. Annual purchases, exclusive of rubber, approximated $40,000,000. The company used about 100,000,000 pounds of rubber a year, all of which was purchased by a subsidiary corporation, the General Rubber Company.

The whole purchasing system was inflexible and costly. This was especially true in the purchase of minor items that were peculiar to one plant. The fact that no one individual in a plant was responsible for purchasing the requirements of the plant caused little interest to be taken in the proper performance of the purchasing function. Purchasing policies announced by the general purchasing department were in many instances dictatorial. As a result there was continual friction between the general purchasing department and the various plants. In some instances this lack of coordination between production and purchasing interrupted manufacturing schedules, and such interruptions, in turn, resulted in delayed deliveries to customers and trouble for the sales department. Excessive inventories often resulted from unwise purchasing policies and the lack of coordination between production and purchase schedules. These evils, with the attendant increased costs and loss of customers, had much to do with the unprofitable operation of the company.

In the general executive offices there was no well-defined means of contact between the executive heads of the various functions of the company. The general purchasing officer's lack of information as to what the other executives were planning interfered with a well-rounded purchasing policy. Lines of authority were not clearly defined, and the resulting confusion often interfered with obtaining prompt executive approval for material commitments.

In December, 1928, new management entered the company, and in January, 1929, a reorganization of the company was initiated. Definite lines of authority were established so that responsibility could be placed on individuals for operating results and on committees for the determination of policies.

The new president, who was also chairman of the board of directors, was responsible to the full board of directors as well as to a finance committee of four and an executive committee of six members. All members of the latter committee were to be operating executives. Both committees were to work in close conjunction with the operating personnel and not to be mere outgrowths of the board of directors as they had been in the past.

Surveys of the company's production facilities convinced the new management that the production and selling units were too widely scattered for efficient operation. Some of the more successful rubber companies, such as the Goodyear Tire and Rubber Company and the Firestone Tire and Rubber Company, had highly centralized manufacturing facilities. The new president, therefore, believed that he should devote his first attention to the development of a policy of general plant consolidation.

It was decided to divide the operations of the company into 12 major operating departments. (See Exhibit 1.) Each of these departments was to be in charge of an executive of proved manufacturing and selling ability who was to be master of his own department and responsible for earning a proper return on the capital the company had invested in his department. It was expected that factories would be consolidated and that each operating department would become a closely knit, self-sufficient unit. Approximately 10 plants would be discontinued, and their facilities discarded or moved to other plants.

All the nonoperating departments of the old organization, such as traffic, advertising, legal, and purchasing, were to be placed in a group known as general service departments, with headquarters in New York City. These service departments were to be available to all operating departments. However, an operating department would not be compelled to use the facilities of the service departments but might do the work itself if it believed that it could perform the service more effectively and efficiently. A charge would be made for the use of the service departments.

The assistant general purchasing officer in the old organization was made director of purchases under the new plan of organization. He reported to the president and to the purchasing committee, which was a subcommittee of the executive committee and was composed of the vice president in charge of finance, two vice presidents in charge of manufacturing, the director of purchases, and the director of commercial research. This committee passed on all major changes in purchasing policy and authorized all commitments which extended over six months or a year, depending on the commodity.

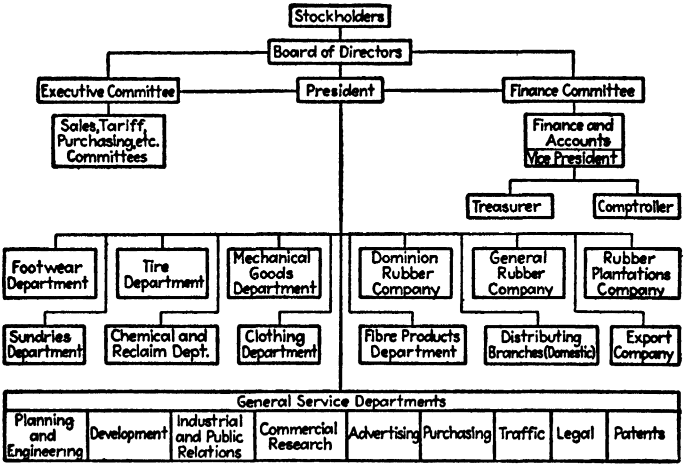

EXHIBIT 1.—United States Rubber Company. Organization chart, 1930.

The director of purchases believed that, in order to make his department a success, he should perform the purchasing function so expertly and efficiently that the operating departments would recognize the advantage of having the central purchasing department do their buying. He realized, however, that, when items were local to one operating department or special conditions were present, purchasing could be carried on locally to the greatest advantage. He therefore encouraged the head of each operating department to appoint a purchasing officer to be in charge of all the purchasing activities of the department.

Under the old organization, no one buyer had been responsible for purchasing any particular commodity or group of commodities. Thus one month Buyer *A* might purchase zinc oxide while Buyer *B* purchased fabrics; during the next month the position would be reversed, and Buyer *B* would purchase the zinc oxide and Buyer *A* the fabrics. This resulted in confusion and lack of continuity in buying experience. The buyers did not become expert in any one commodity or group of commodities and thus could not purchase to great advantage. In the hope of correcting this condition the director of purchases organized his department on a commodity group basis as shown in Exhibit 2.

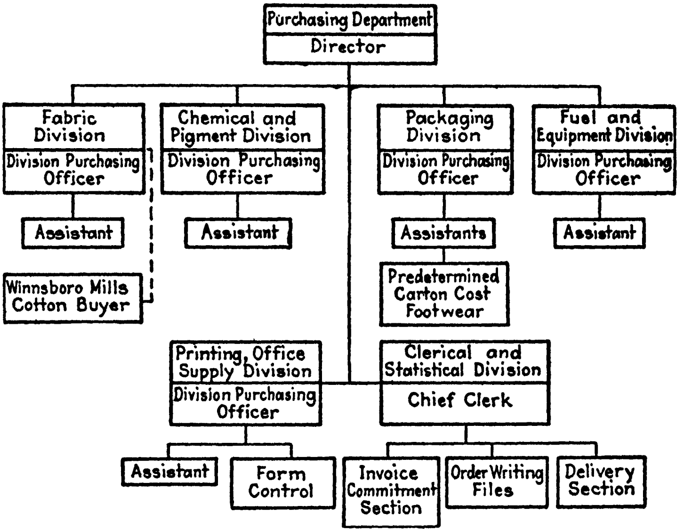
Purchasing Department
Director
Fabric Division
Division Purchasing Officer
Assistant
Winnsboro Mills Cotton Buyer
Chemical and Pigment Division
Division Purchasing Officer
Assistant
Packaging Division
Division Purchasing Officer
Assistants
Predetermined Carton Cost Footwear
Fuel and Equipment Division
Division Purchasing Officer
Assistant
Printing, Office Supply Division
Division Purchasing Officer
Assistant
Form Control
Clerical and Statistical Division
Chief Clerk
Invoice Commitment Section
Order Writing Files
Delivery Section

EXHIBIT 2.—United States Rubber Company. Purchasing department.

Each of the five groups into which the commodities were divided was to be known as a division, and the buyer in charge was to be known as the division purchasing officer. The fabric division was to buy all fabrics, including drills, jeans, sheeting, twills, whipcord, enameling duck, wool fleece, felt, and cotton. The chemical and pigment division would purchase such items as zinc oxide, chalk whiting, pine tar, carbon black, linseed oil, mineral rubber, sulphur, gasoline, mica, and lime. The packaging division was to buy all materials needed to package the company's products, including kraft tire-wrap paper, burlap transfer labels, cans, paper tubes, bottles, and lumber. The fuel and equipment division was expected eventually to purchase all machinery and plant equipment, but until the many changes resulting from the new plan of plant consolidation were completed, it was expected that the planning and engineering department would make all equipment purchases. However, the fuel and equipment division would buy coal, aluminum, copper, lead, and steel. The printing and office supply division was to purchase all the supplies needed by the sales and administrative offices.

The buyers were expected to become specialists in the commodities which they purchased, and to know in detail the factors affecting supply and demand and price movements. They were to maintain all necessary statistical records and, if they wished, could call on the commercial research department, one of the general service departments, for special studies and statistics on business conditions, industries, and commodities.

A central clerical and statistical division within the general purchasing department was to be in charge of a chief clerk. Three sections—invoice commitment, order writing and files, and delivery—were to perform the routine work of receiving, recording, and consolidating requisitions; writing, recording, and filing orders; and tracing orders to insure delivery to the plants as scheduled for production purposes.

The purchasing officers located in the various operating departments were to be responsible to the executives of the departments and not to the director of purchases. The general purchasing department was, however, to have advisory jurisdiction over the local purchasing departments in the matter of buying policy. The director of purchases could suggest changes which he believed would lead to greater efficiency, but the executive in charge of an operating department had the final authority. It was hoped, however, that a spirit of cooperation would prevail and that all action would be directed toward policies which would reflect the greatest advantage for the company.

Each operating department was to be divided into three major divisions: manufacturing, sales, and control. The manufacturing division was to include all production facilities, laboratories, and facilities for the development of new products. The sales division would have jurisdiction over all sales activities. The control division was to act as a coordinating unit between manufacturing and sales and would include among its duties all accounting and statistical records for the operating department, all cost accounting, the compilation of manufacturing schedules, the control of raw materials and finished goods inventories, and purchasing.

After reorganizing the general purchasing department and aiding in the establishment of a suitable purchasing unit for each operating department, the director of purchases announced the policy which he hoped would govern purchasing. In general he wanted the local purchasing departments to buy locally all items which could be purchased advantageously by them. Among such items would be materials and equipment that were used in only one operating department, such as tire molds in the tire department; items that were needed infrequently but urgently when the need arose, such as machinery parts; and items that could be purchased locally as cheaply as centrally, such as maintenance supplies, pipe, valves, and some of the packaging supplies.

The director of purchases was thoroughly convinced that the effective performance of the purchasing function depended largely upon the cooperation of the local purchasing officers. By giving them definite authority to buy certain items, he hoped to increase their prestige both in the plant and in the community. The director of purchases believed that this change in attitude toward the local buyers would develop a greater sense of responsibility in the buyers. Moreover, they would have more work to do and less time to criticize the general purchasing department. In order to aid them, the director of purchases expected to make frequent visits to the various local purchasing officers and through them meet local suppliers. He hoped by this means to impress upon the suppliers that the general purchasing department was interested in the local purchasing departments and was giving them active support.

Copies of purchase orders placed locally were to be sent to the general purchasing office, where prices would be checked. If the general purchasing department had obtained prices that were lower than those paid by the local purchasing department, the local buyers would be so notified. Blanket contracts and contracts for requirements within maximum and minimum limits were to be made whenever possible by the general purchasing department. The local purchasing departments would be given copies of each contract and would place their orders against the contract directly with the suppliers, at the same time sending a copy of the order to the general purchasing department. Such contracts usually would be made for six months or a year, depending on the custom of the trade and the nature of the material.

The requirements for the various materials needed in the operation of the company would be determined from a number of sources. Each operating department was to be governed by a yearly budget which would be revised quarterly but always be kept for a year in advance. This budget would state the number of units which the company expected to produce over the period and the amount of money which would be required to produce the units. The planning and scheduling divisions of each operating department kept a running production schedule three months in advance with the first month's schedule definite and the last two estimated and subject to revision. Nearly all materials that were stocked would be governed by maximum and minimum limits which would be determined after consideration of the amount used in a production period, the time required to obtain the material, and whether or not the material deteriorated rapidly or was subject to obsolescence.

Inventory reports for materials used in the manufacturing process were to be submitted to the general purchasing department each month. These reports would show the amount of the materials on hand and the amount on order. The director of purchases might comment on the condition of the inventory, but the final control of inventory was to be vested in each operating department.

After the production schedules had been determined, requisitions were to be filled out showing what materials would be needed to meet the requirements of the schedule. The requisitions would then be checked against the inventory of materials on hand, and the amounts that would have to be ordered were determined. If the materials were to be purchased by the general purchasing department, the requisitions were forwarded to New York; otherwise they were retained for use by the local purchasing department. The director of purchases expected that under the new plan of organization approximately from 85% to 90% of the total purchases would be performed by the general purchasing department.

The director of purchases would require each division purchasing officer to submit a monthly report covering the work accomplished by his division. These reports were expected to mention the market conditions concerning the various items bought by the division; the work being performed at the time; the work accomplished since the last report; and any savings that had been made. These reports were to be submitted to the executive committee.

In the middle of each month, multigraphed forms, each of which listed commodities of interest to a particular manufacturing department, were to be sent by the director of purchases to the division purchasing officers with a request to fill in the actual market prices then prevailing. After these reports were properly filled in and returned to the director of purchases, copies were distributed among the various manufacturing departments.

Every three months each division purchasing officer was expected to submit a report known as the forecast price list. This report was to give estimates of prices which were expected to prevail monthly for the coming year. These estimates were to be based on the buyer's study of the market, trade publications, and contacts with producers. The reports would be sent to each operating department, where they would be used in preparing raw material budget estimates.

Whenever the local departments employed the services of the general purchasing department, they would be charged with the cost to the central purchasing department of performing such services. A plan was worked out which made possible, to the satisfaction of the general purchasing officer, the determination of such costs within a reasonable degree of accuracy.

The director of purchases realized that after experience was gained through the operation of the plan many changes would have to be made in the new organization.

7. CARLYLE MACHINERY COMPANY

REORGANIZATION TO CORRECT OVERCENTRALIZATION

In June, 1930, a new general purchasing officer was appointed by the president of the Carlyle Machinery Company, manufacturer of heavy machinery, oil and gas engines, condensers, and hydraulic turbines. After making a survey of the methods and routine of the purchasing department, Mr. Probeck, the new general purchasing officer, decided that certain changes could be made that would allow the benefits of completely centralized purchasing control and at the same time greater decentralization of the actual placing of orders and the routine involved. He believed that greater decentralization would permit increased flexibility within the organization and would result in more economical and efficient operation of the purchasing department.

The Carlyle Machinery Company, with executive offices in New York City, was one of the largest manufacturers of pumps and heavy machinery. The manufacturing facilities of the company were located in four plants: Trenton, New Jersey; Boston, Massachusetts; Cleveland, Ohio; and Rochester, New York. Each plant specialized in the manufacture of certain groups of the company's products; for instance, all Diesel engines were built at the Rochester plant. An engineering department in each plant designed the products made in that plant.

World-wide distribution of the company's products was obtained through company sales offices in the principal cities in the United States and foreign countries. In 1929 the total sales of the company amounted to $20,000,000, approximately 50% of which represented products that required special designing and building. In recent years the company had noted a definite upward trend in the number of orders for products to be manufactured according to the specifications of the buyer. Such products could not be carried in stock and were built only after orders actually had been received.

The vice president in charge of manufacturing and engineering acted as the general manager in charge of all the company's production facilities. Under his leadership an operating committee, composed of the four plant managers, determined policies affecting the operation of the production facilities of the company.

All stores and inventories of both raw and finished materials were under the control of the same vice president. He was also the executive to whom the general purchasing officer reported (See Exhibit 1.)

The general purchasing department was located in New York City, with the executive offices of the company, and was in charge of the general purchasing officer, as shown in Exhibit 2. The general purchasing officer supervised the placing of all large contracts. An assistant general purchasing officer was responsible for the department when his superior was away. The assistant bought all pig iron, scrap, coal, alloy metals, oils, and lubricants for all the plants. The other materials needed by the company were purchased by three buyers, to each of whom was assigned a specific group of commodities. One buyer purchased all stationery and printing; the latter was an important item because of the technical nature of the printed material used by the company in its sales work. Electrical equipment and supplies, motors, turbines, lumber, paints, and bolts and nuts were purchased by another buyer. The third buyer bought all steel bars, forgings, shapes, tubes, and sheets. A chief clerk, in charge of records and files, and seven clerks and stenographers completed the personnel

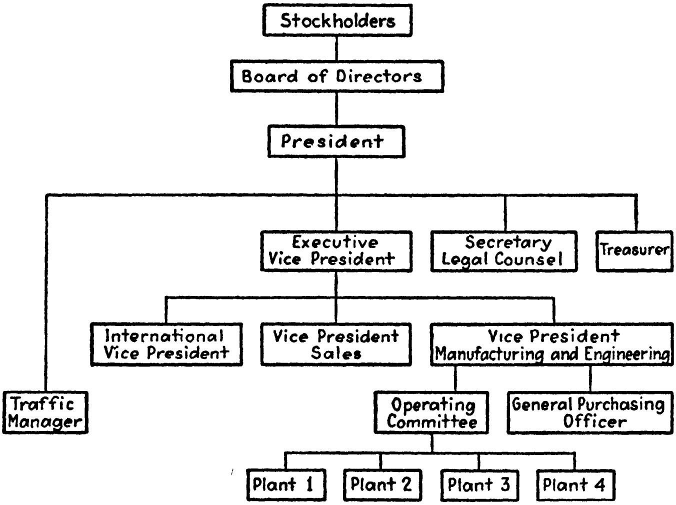

EXHIBIT 1.—Carlyle Machinery Company. Organization chart.

of the New York general purchasing department. Purchases made by the general purchasing department in 1929 approximated $6,700,000.

In addition to the general purchasing department in New York, the company maintained in each plant a purchasing department with a purchasing officer in charge. The general purchasing officer determined the general policies to be followed by the plant purchasing departments and controlled their personnel, taking care to have the personnel acceptable to the plant managers. At the Cleveland plant the purchasing department was comprised of a purchasing officer and four clerks; the Rochester plant required a purchasing officer, an assistant, and four clerks; the Boston plant, a purchasing officer and two clerks; and the Trenton plant, a purchasing officer, an assistant, and six clerks. The combined purchases made by the plant purchasing departments in 1929 approximated $300,000.

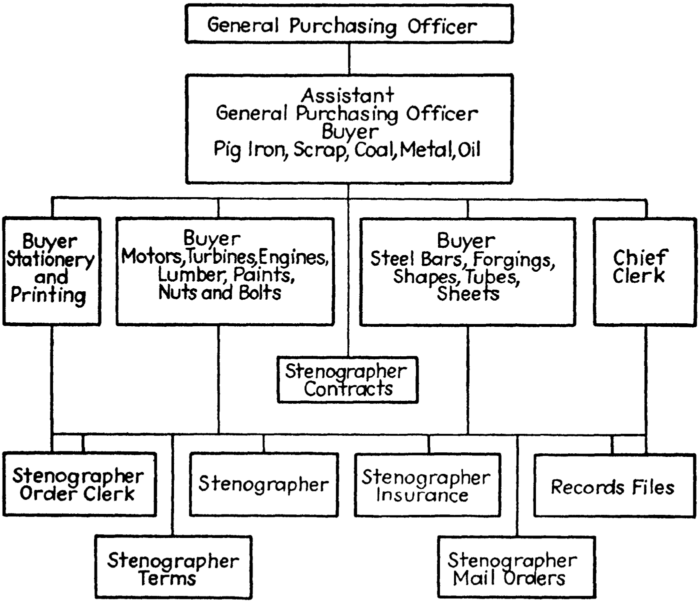
General Purchasing Officer
Assistant General Purchasing Officer Buyer Pig Iron, Scrap, Coal, Metal, Oil
Buyer Stationery and Printing
Buyer Motors, Turbines, Engines, Lumber, Paints, Nuts and Bolts
Buyer Steel Bars, Forgings, Shapes, Tubes, Sheets
Chief Clerk
Stenographer Contracts
Stenographer Order Clerk
Stenographer
Stenographer Insurance
Records Files
Stenographer Terms
Stenographer Mail Orders

EXHIBIT 2.—Carlyle Machinery Company. Organization of the general purchasing department.

Under the policies followed by the predecessor of Mr. Probeck, except in emergencies the plant purchasing departments could make only those purchases in which the sum involved was less then $300. All other purchases had to be made through the general purchasing department. For this purpose each plant sent requisitions for its requirements to the New York office. Such a method entailed a large amount of correspondence and many records. A further disadvantage was encountered when articles were being manufactured to fill special orders. In such cases the engineering department had to consult the local plant purchasing officer on matters of material supplies and prices. He, in turn, communicated with the general purchasing office in New York. This procedure not only was inflexible but also involved considerable time. The former general purchasing officer had followed a policy of requiring that all correspondence and orders be sent to him for review and signature. As a result he had been obliged to review personally all activities of the purchasing department. Thus he was burdened with routine; and the buyers, as well as the plant purchasing officers, were not encouraged to develop a sense of responsibility for their own activities.

Mr. Probeck believed that the function of the general purchasing officer was to determine policies rather than to perform detailed routine operations. He believed, furthermore, that unless he had the time to think over the problems of his department, he could not formulate effective policies or actively promote the interchange of ideas and opinions which would be to the greatest advantage of the company. He was convinced also that if the buyers and plant purchasing officers were given more responsibility, they would perform their work with greater efficiency and more constructive effort. Moreover, if the plant purchasing officers did more direct purchasing, there would be less red tape and fewer records at the New York office.

In accordance with his convictions Mr. Probeck drew up a plan which he considered well suited to the development of the purchasing function. He realized that one of his problems would be to educate the plant purchasing personnel so that it would be able to carry out the operation of his new plan. He proposed to add new responsibilities gradually, watching the results closely in order to determine the capabilities of the members of the various plant purchasing departments. He intended to change the existing personnel only when it proved inefficient, for he believed that, when the members of an organization of a manufacturing plant had become accustomed to working with a certain man and liked him, it was difficult to replace that man with another, however efficient the new one might be. The new man would be handicapped by having to combat the resentment of the personnel at the replacement of a friend.

Mr. Probeck was convinced that the plant purchasing officers should place as many as possible of their purchase orders directly with the suppliers. This policy could be followed and the advantages of centralized buying still be retained if the general purchasing office made contracts providing for the quantity of those items required by two or more of the plants. Typical examples of products which could be ordered under these contracts were nuts and bolts, condenser tubes, electric motors, electrical equipment, and steel. Plant purchasing officers would be expected to place orders directly against such contracts. Similar contracts for requirements had been made in the past, but orders against these contracts had been placed only by the general purchasing officer. Mr. Probeck believed further that there were certain items for which the plant purchasing officers could contract directly, without any action on the part of the general purchasing department.

Under the new system of procedure each plant purchasing officer would be furnished with pertinent information concerning all purchase contracts that were in force and against which orders could be placed. In placing orders, the plant purchasing officer was to make out a purchase order with six copies, one of which was to go to the New York purchasing office as a record of the transaction.

Under this new method the procedure of ordering materials or products covered by contracts would be simplified, time would be saved, and less clerical labor would be required in the general purchasing office. Mr. Probeck expected that, since the plant purchasing departments would be able to furnish more definite information when asked about prices, materials, and deliveries, there would be increased coordination between the plant purchasing departments and the plant engineering departments.

The general purchasing officer decided to call a meeting of all plant purchasing officers in order to present his new plans. He hoped that if the plant purchasing officers were given an opportunity to contribute suggestions, they would cooperate in making the operation of the plan a success.

In preparation for the meeting Mr. Probeck assembled the material which he considered it advisable to use in introducing his plan. His first concern was to formulate the principles upon which, in his opinion, the operation of the purchasing department should be based. He stated these as follows:

1. Only those materials should be secured that will prove the cheapest in the long run, price and quality considered.
2. The source of supply to be used should insure the best possible service obtainable.
3. All purchases should be scheduled in order to keep inventories at a minimum.
4. In order to effect maximum economies, full advantage must be taken of the company's centralized purchasing power.
5. It should be remembered that the primary object of the company is to sell its products; and its purchases from its customers should be so conducted as to insure the greatest advantage possible.

In order to apply these principles effectively, it was necessary to set up a procedure which could be followed by the plant purchasing officers in buying items designated by the general purchasing department for local purchase. The plan of procedure drawn up was as follows:

1. Each plant purchasing department will be expected to compile, in cooperation with and subject to the approval of the general purchasing department, an approved bidders' list for each class of items purchased at the plant. Changes in this list will be subject to the approval of the general purchasing officer.
2. Requests for quotations will be sent to the entire list of approved bidders. A copy of such a request will be sent to the general purchasing department at the same time that it is mailed to prospective bidders.
3. A summary of all quotations received will be mailed to the general purchasing department with a recommendation as to which supplier should be awarded the contract.
4. After the quotation has been approved by the general purchasing department, the plant purchasing department will place the purchase order. If an emergency exists and immediate action is required, a summary of quotations and the recommendation will be forwarded by night letter or regular telegram.
5. In the past, the plant purchasing departments' expenditure for an item or a group of similar items has been limited to $300. This limit will continue to be in force but will be waived on items agreed upon by the general purchasing department.

After working out a method of procedure for making local purchases, the general purchasing officer considered what specific items, other than those purchased under the $300 limit, could be purchased more advantageously by the plant purchasing departments than by the general purchasing department. Such items would be purchased directly from the supplier by the local plant purchasing departments. The local departments then would be responsible for all purchase negotiations and contractual relationships. The general purchasing officer believed that the following items would serve to put the new plan into effect:

1. Forgings and steel castings are to be purchased by the plant purchasing departments. These items are individual to each plant; and, although in the past they have been purchased by the general purchasing department, they have been purchased whenever possible from suppliers in the same locality as the plant requiring the items. This has been done in order to save freight, which is a major item in the costs of bulky and heavy castings.

2. Machine tools are to be purchased by the plant purchasing departments. These items are generally purchased for particular needs in a plant, and there is no advantage in consolidating requirements. The following procedure is to be followed:

   a. Before a capital appropriation is requested from the appropriation committee in order to purchase machine tools, requests for bids should be sent to all companies on the approved bidders' list for that particular tool.
   b. Either the bids or a summary of the bids should accompany a request for an appropriation.
   c. After approval by the appropriation committee at the New York office, all papers should be sent to the general purchasing department for approval of vendor and price.
   d. On receipt of the approved papers by the plant purchasing department, the purchase may be made. It should be understood by all plant purchasing officers that, in making purchases of this sort, even after approval has been received all efforts should be made to obtain the lowest possible price.

3. Scrap is another item to be handled locally. The plant purchasing departments are not only to secure competitive quotations on all scrap to be purchased, but also to solicit offers on scrap material to be sold. Scrap prices vary considerably in the several local markets, and it is believed that the local plant purchasing officers are in the best position to watch the local scrap market. A tabulation of the quoted prices should be referred to the general purchasing department for authority to purchase or sell. In the case of purchase of scrap, the plant purchasing officer should submit recommendations of the quantity

to be ordered and the production period to be covered. The order placed will be based on the approval of the recommendations.

4. Such items as hardware, supplies, repair parts, brooms, soap, and other maintenance supplies, which in the past have been purchased locally under the $300 purchase limit, will continue to be purchased by the plant purchasing departments.

In general the plant purchasing departments were to be allowed to order directly against the contracts made by the general purchasing department. One exception to this policy and one further point in the proposed procedure were to be mentioned at the meeting:

1. Orders for electrical equipment other than motors, generators, and exciters, which have heretofore been placed through the general purchasing department, are to be placed directly by the plant purchasing departments as soon as a definite procedure can be worked out with the electrical companies for acceptance of such orders at local branches.
2. In cases where contracts for the company's requirements are split between two or more suppliers, the general purchasing department is to advise the local purchasing departments of the percentage of requirements to be ordered from the various suppliers.

The general purchasing officer estimated that under his plan approximately 12% of the total annual purchases would be made directly by the plant purchasing departments. About 70% of the total materials required annually would be ordered by the plant purchasing departments against contracts made by the general purchasing department. The remaining 18% would be taken care of in all details by the general purchasing department. Among the items included in this latter group were the basic raw materials used by all plants, such as pig iron, coal, and coke. Since these materials could be ordered in quantities which would last over a predetermined production period, they would be ordered through the general purchasing department by the use of requisitions. Market conditions for these materials were such that often it was not advisable to place contracts for requirements.

The general purchasing officer realized that as the methods were put into use further changes would be necessary. He planned to visit the plant purchasing departments frequently in order to aid the personnel in meeting their new responsibilities and in making contracts for those items which were to be purchased locally. By having all local purchasing officers meet with him at intervals to discuss common problems, he planned to encourage suggestions for the improvement of purchasing methods.

8. WATTERSON COMPANY

CENTRALIZATION OF MERCHANDISING DUTIES

In 1931 the Watterson Company decided to make a systematic effort to centralize the duties involved in the performance of the merchandising function. The primary purpose of this undertaking was not to add any new duties but to obtain better organization for the performance of existing duties.

The Watterson Company was founded during the Civil War and from a small cellar workshop had grown by 1931 to be one of the largest enterprises of its type in the world, with annual sales amounting to several million dollars. The founders had started out with only one type of product which was distributed directly to consumers by means of house-to-house selling. As the business prospered, the company's line was widened to include industrial, testing, and research products designed for use in educational institutions and industrial companies.

The World War created a huge demand for the company's existing lines, and also for new types of industrial, testing, and research products which had to be developed to meet the needs of the government and of industrial companies. Before the War the company's line of such products had accounted for between 20% and 30% of the total business. Since the War, however, there had been a definite increase, so that in 1929 and 1930 the sale of industrial, testing, and research products amounted to about 50% of the total business.

The company maintained wholesale branch sales offices for its consumer products in the principal cities of the United States and Canada. Each branch served as the district headquarters for the salesmen who sold to jobbers and retailers in that territory. In 1928 the company purchased a substantial interest in several of the major jobbers selling the company's products throughout the country. The jobbers still continued to sell competitors' products and were responsible for their own management policy, but they were aided in their problems of inventory control and credit policy by the Watterson Company.

The market for the Watterson Company's consumer products was extensive, as it was estimated that four out of every ten persons were users or prospective users of this type of product. A reasonable assumption was that repeat demand could be expected about every five years. Before the World War the company had had little domestic competition in the sale of its consumer products, but since then aggressive competitors had entered the market and were making active bids for business. None of these competitors manufactured a complete line of industrial products to accompany their consumer products. The Watterson Company had successfully retained its competitive position and in most instances was slightly ahead of its competitors in styling.

Before 1920 little attention had been paid to the style element in the company's line of consumer products. Since that time, however, the rapidity of change occurring in almost all commodities, together with the increased consciousness of the American people toward style in the articles which they used in their everyday pursuits, had made it imperative for the company to style its consumer products. Suggestions were welcomed from consumers and retailers as well as from the sales, purchasing, and engineering departments. A convention of the jobbers was held at the factory twice a year, at which time new styles were presented to the jobbers for their comments, and their suggestions were studied closely.

Because of the highly technical nature of the company's lines of industrial, testing, and research products, sales were made by the company's salesmen directly to educational institutions and industrial companies. It was the policy of the company to employ men already trained in engineering and then give them a special course at the factory in order to familiarize them with the facilities which the company had to offer. In selling these specialized products to industrial companies, a salesman had to study the needs of each prospective customer and then show him that the use of Watterson products would give an added control over his manufacturing process. In dealing with educational institutions and in some instances with research departments of industrial concerns, it was sometimes necessary for the salesmen to obtain from the prospective customers their ideas of what they wanted developed or built to order.

The educational and industrial markets for Watterson products were of undetermined limits. In the latter part of 1929 the engineering department, at the suggestion of the management, established a special division to investigate all possible uses for the company's industrial products in the major industries. As the results of this research work were made available for a particular industry, the sales department distributed special booklets and catalogues and then conducted a sales campaign among the major companies of that industry. From time to time classes were held at the factory for men from the various industries. These classes usually lasted for a period of from two to four weeks, admission being by invitation. By 1931 this program of research was in full operation. Sales research activities were still in an embryonic state, but a man trained in making market analyses had taken over the work and was preparing the necessary background for a comprehensive plan of providing up-to-date analyses of present and future markets.

The company's organization as it existed in the spring of 1931 was the result of a steady growth and development, with certain definite contributions made within recent years by some of the younger executives. The operating and financial control of the company was within two family groups, although employees were permitted to purchase certain classes of the company's stock and thus shared in any benefits derived from the growth and prosperity of the company. In addition to the president, the general manager, and the treasurer, there were five directors, each of whom was the head of an operating division. One of these directors was the comptroller; the others were in charge of sales, engineering and research, production and service, and manufacturing.

The sales division was divided into three major groups, as shown in Exhibit 1. One group sold all consumer products and certain equipment used by retailers in the sale of the consumer products. The salesmen in this group called on both jobbers and retailers. In many localities orders received from retailers were turned over to the jobbers.

The second group of the sales division specialized in sales to educational institutions. At one time salesmen in this division had specialized by products, but in recent years salesmen had been assigned to definite territories and thus specialized by customers instead of by products. Certain standard types of research products accounted for the major portion of the sales to educational institutions. The rest of the sales were made up of special orders for products designed to meet the needs of any professor who was doing special development or research work. This special-order business had not been profitable, but the company deemed it necessary in order to maintain and develop goodwill. Then, too, in some instances specially built units could later be adapted to industrial usage.

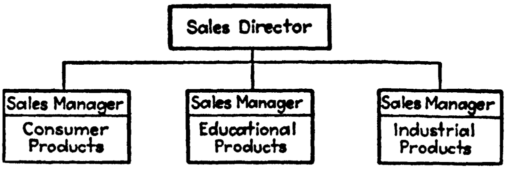

EXHIBIT 1.—Watterson Company. Sales division.

The third group of the sales division made all sales to industrial users. The industrial line comprised approximately 500 separate items, many of which were also included in the educational line. In the past, salesmen selling to industrial users had specialized by groups of products; since this policy had required that several company salesmen call on one industrial company, a change had been made in order to avoid situations which had not proved satisfactory. In recent years salesmen had specialized by territories and customers, and each salesman had sold the entire line of industrial products. Starting in 1931 special study was given to one industry at a time, and selling efforts were centered on that industry. In this manner it was hoped that the company would be able to broaden its markets.

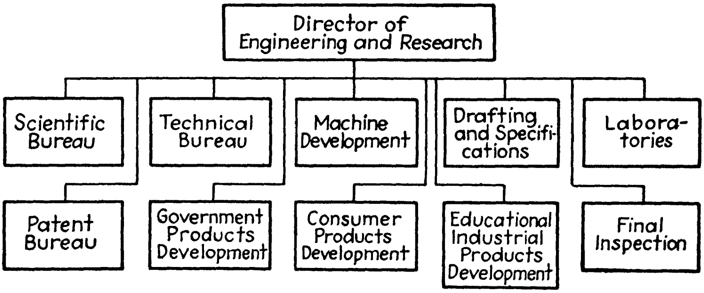
Director of Engineering and Research
Scientific Bureau
Technical Bureau
Machine Development
Drafting and Specifications
Laboratories
Patent Bureau
Government Products Development
Consumer Products Development
Educational Industrial Products Development
Final Inspection

EXHIBIT 2.—Watterson Company. Engineering and research division.

The engineering and research division, shown in Exhibit 2, had been looked upon as one of the most vital departments because of the scientific nature of the company's products. This division was responsible for the development of these products. It worked upon its own ideas, as well as on ideas presented by customers or recommended by the sales division, although the engineering and research division made the final decision as to the developmental and research work to be performed. Its duties were performed by 10 subdivisions as follows:

1. Scientific bureau, which was expected to follow scientific developments and to apply such developments to the company's existing products whenever possible. All new products developed in the division had to be approved by this bureau before they were adopted for manufacture.
2. Technical bureau, which was responsible for all technical matters concerning the design and function of the products. All products developed in the division had to be approved by this bureau also before manufacturing.
3. Machine development department, which was responsible for all research and development work necessary for the construction of the machines which were sold to retailers to facilitate the sale of consumer products.
4. Drafting and specifications department, which was responsible for making all drawings and compiling all specifications, both for finished products and for raw materials. On specifications for raw materials, the purchasing department was consulted in order that commercial standards would be followed whenever possible.
5. Laboratories, which were responsible for making all tests involving chemical analyses.
6. Patent bureau, which performed all duties necessary for the obtaining of patents and for the investigation of any patent infringements.
7. Government products development department, which performed all research and development work on products and equipment used for government purposes.
8. Consumer products development department, which concerned itself with the technical development of the consumer products. While this department actually worked out the new styles, most of the suggestions for them were received from the sales department and from jobbers.
9. Educational-industrial (testing and research) products development department, which was concerned with all research and development work necessary to bring out new products and improve existing products.
10. Final inspection group. This group made a thorough inspection of all products before they left the factory.

The manufacturing division performed all duties necessary for the actual manufacture of the various products. This division was divided into 10 departments, one of which was concerned with the development of equipment used in the manufacture of the company's products, and another with process development. The latter department was located in the manufacturing division instead of in the engineering and research division, where it properly belonged, simply because it had been developed in the manufacturing division. It was responsible for studying the methods of manufacture and for suggesting and planning changes which would lead to better control of quality or greater efficiency or both.

The director in charge of the production and service division controlled functions not usually found together in an industrial company. In addition to the duties commonly involved in production planning and finished products inventory control, this division also operated the purchasing department. The latter purchased all the materials and equipment used by the company, operated the company trucks, received and, with the assistance of the laboratories, inspected all incoming materials, and was in charge of raw material stocks.

The employee training group was also a part of the production and service division. This group operated the employee suggestion system by which the employees were encouraged to suggest improvements in products, process, and management. Training and education work consisted of training college men who were brought in to learn some branch of the business; working in cooperation with local technical schools; and training factory employees for higher positions.

The fifth major division of the company was known as the comptroller's division. The head of this division also served the company as assistant treasurer. In addition to the duties usually associated with this function, the division operated the legal department and supervised the jobbing concerns in which the company owned an interest. Within this division also there was a group that made market analyses and compiled sales estimates in order that a check could be made on the budget estimates submitted by the sales division. This group also made market studies for the sales division.

The fact that the management of the company was closely held, the outstanding ability of the presidents, and the company's unique position of having little or no able domestic competition until very recent times were among the factors which had allowed the company to grow and prosper without material change in its organization. Gradually the major divisions had acquired additional duties, often as a result of the force of the personality of the executive rather than because the added duties logically belonged in the division.

Although the company operated smoothly under the existing setup, and there was splendid cooperation among the major executives, it was nevertheless becoming apparent in 1931 that the executives of the company might well consider realigning certain duties in order to benefit from the interaction of duties which naturally fell into the same group. Such a realignment seemed especially essential in considering the duties involved in the performance of the merchandising function. In the past, merchandising had not been recognized as a distinct function in the operation of the company. Merchandising duties were scattered among all the major divisions; and although the engineering and research division attempted to coordinate all duties involved in the development and selection of new products, and the production control division attempted to centralize and coordinate all activities relating to the quantity of each item to be produced, in neither case were the duties so aligned as to facilitate the accomplishment of the task to the best interests of the company.

Some of the company's executives believed that the lack of appreciation of merchandising problems could be traced to tangible causes. Almost from the beginning, the major problems of the company were those involving engineering and technical knowledge. In order to reduce costs and thus lower the selling prices of the company's products, it had been necessary to develop intricate machines which could supplant highly skilled labor. The fact that the products required great precision and broke easily intensified the difficulties and created problems the solution of which required an enormous amount of technical thought and skill. The problems of improving the product and developing new industrial products were of a highly technical nature and of necessity were worked on by engineers and men with a technical point of view. The whole atmosphere of the company reflected the predominance of the engineer.

The company had been able to follow a policy dictated by engineers without severe reaction from the market because there was little or no aggressive domestic competition. The reputation of the Watterson Company rested firmly on the soundness and brilliance of its engineering. After 1920, however, there was a noticeable increase in the tempo of business, higher standards of living were achieved, and rapid progress was made in the improvement of methods of marketing and distributing products. These conditions reacted to the benefit of some of the company's small competitors which had more flexible organizations and were able to follow more aggressive merchandising policies.

Not until 1927 did the Watterson Company fully realize that a revision of policy was necessary and that engineering policies were desirable only in proper perspective to general policies. More attention was given to the style element in the consumer products, and more aggressive methods were introduced for the

EXHIBIT 3
WATTERSON COMPANY
New Products Added, Products Dropped, and Design Changes, 1925–1930

	1925	1926	1927	1928	1929	1930
Total new products added (1925 = base)	100%	92%	81%	78%	81%	158%
Percentage of the year's total:						
Consumer products	52	55	45	58	48	31
Educational products	24	27	41	34	34	25
Industrial products	24	18	14	8	18	44
	100%	100%	100%	100%	100%	100%
Products dropped (1925 = base)	100%	152%	140%	200%	204%	181%
Percentage of the year's total:						
Consumer products	32	28	37	33	34	25
Educational products	12	28	28	32	30	22
Industrial products	56	44	35	35	36	53
	100%	100%	100%	100%	100%	100%
Design changes in old products (1925 = base)	100%	94%	80%	89%	85%	158%
Percentage of the year's total:						
Consumer products	10	7	5	12	11	2
Educational products	60	65	49	52	52	70
Industrial products	30	28	46	36	37	28
	100%	100%	100%	100%	100%	100%

NOTE: In 1925 the total number of the company's products (exclusive of government) were divided among the various lines as follows: consumer products 15 %, educational products 55 %, industrial products 30 %. The total new products added equaled 10 % of all the company's items in all lines. Products dropped in the same year equaled 4 % of total items in all lines.

distribution of all the company's products. As the number of the company's products increased, there was continual need to make decisions on the adoption of new products, the dropping of old, the quantities to manufacture, the development of markets, style, and the many other questions and problems involving the merchandising of the company's products. The extent to which the company added and dropped items and changed the designs of its products from 1925 through 1930 is shown in Exhibit 3.

In 1931, at the time when a realignment of duties within the organization was being considered, the duties necessary in the performance of the merchandising function were still scattered among four of the five major divisions. The following is a brief summary of how some of the duties were divided.

In the determination of what new products to manufacture, the following divisions or groups of departments performed one or more duties:

1. The sales division, with its broad market contacts, was responsible for over half of all suggestions submitted for the development of new products. Each salesman was required to submit a daily report covering his activities and describing any suggestions for new products.
2. The production and service division was given an opportunity to express an opinion on the advisability of adding new products. From its knowledge of how the new product would fit into existing production schedules, this division was often able to make pertinent suggestions. The purchasing department, which was in this division, was often able to pass judgment on new products and to suggest new products as a result of ideas or information received from vendor salesmen. Before new products were adopted, the purchasing director often had to investigate sources of supply to insure that desired quality could be secured from reliable suppliers at a reasonable cost.
3. The comptroller's division, through its control of the sales and market analysis work, of all budget figures, and of the statistics of operation, indicated the market potentials on each manufacturing authorization. This division was also undertaking sales research work which, when developed, was expected to aid in determining the sales possibilities of the new products to be manufactured.
4. The engineering and research division had the most important part in the determination of the new products to be produced. In fact, this division had the final authority in deciding whether or not to proceed with the development of a new product. Only through appeal to the president or to the general manager could the sales division force the engineering and research division to undertake the development work necessary to bring out a new product.

Title________________________

Give description of product as completely as it is possible to visualize it:

Expected to result in—(Check proper classification)

80-1______Experimental new product for special customer.
80-2______Experimental new product development.
80-3______Research work on products.
80-4______Experimental improvement in present product.

Desired net selling price____________________

Expectations as to market____________________

How will this affect sales of present product?________

Maximum amount that should be spent on work______

Copies of order to	
Sci. bur.	
Tech. bur.	
Draft.	
Ind. prod. devel.	
Cons. prod. devel.	
Mach. devel.	
a. Manufacturing superintendent	
b. Manufacturing superintendent	
Plant	
Cost	

Check work to be done:
Experimental______ Preliminary design______ Sample______ Estimate______

Signed by__________________ Date__________ Priority____ Class____
Approved by__________________ Date__________ F. O.__________

EXHIBIT 4.—Watterson Company. Official order for product experimental and developmental work.

Class	Date
Product Description	

Refer to sample and attached information		Assigned to	Signature	Date
DESIGN	Specific type			
	Mechanical			
PATENT				
INSPECTION				
MANUFACTURE				
ESTIMATE				
SALES	Data for Sales Manual			
	Manufacture of what items affected			
	Product designation Net price Quantity			
ADVERTISING				
PRODUCTION				
GENERAL SPECIFICATIONS	List of parts Drawings Operating layout Assembly layout Container data Red order			

Noted by	General manager	Director in charge of production	Director in charge of engineering and research

Production promise date		Product description
Placed on priority		
Ordering specifications received		
Factory order placed		
Cont. stk.	Fin. prod. stk.	

Exhibit 5.—Watterson Company. Manufacturing authorization for new industrial product work.

Frequently, when a market survey was necessary to estimate the potential market for a new product, the engineering and research division compiled and mailed questionnaires seeking information that would be of help in determining the marketability of the new product. On some occasions the engineering and research division would ask the sales division or the purchasing department to determine the extent of the market. There was no one definite procedure. The head of the engineering and research division, however, believed that, because of the technical nature of the company's products, his division was best qualified to know the uses for the products and hence to pass judgment on the extent of the market. Whenever it was decided to develop a new product, a form, shown in Exhibit 4, was prepared which had to be signed by the director in charge of engineering and research. This executive was held responsible for all expenditures incurred by the development of products and was allowed a definite sum each year for the work of his department.

When a new product had been developed by the engineering and research division and was ready for production, a manufacturing authorization, shown in Exhibit 5, was compiled and sent to each of the major divisions with the exception of the comptroller's division. In this way each division was shown the status of the new product and given an opportunity to signify that the division was prepared to perform the duties required in the production of the item. Thus no executive could claim later that he had not been consulted or informed of new developments. The specific contributions of the various divisions were as follows:

1. The engineering and research division usually made a recommendation, based on its market survey, as to how many units of a new product should be produced on the first manufacturing schedule. More units than were required immediately were usually manufactured, as the cost of building only one unit was excessive and it was hoped that future demand would absorb those units not used at once. Only on standard products were economical lots of manufacture possible.
2. At the time it compiled its estimates for the budget, the sales division offered suggestions as to the number of various products which should be made. If conditions were altered materially after the budget was made, the sales division was expected to report the nature of the changes and their effects on its budget estimates.
3. The comptroller's division had an influence on the determination of the volume of production through the operation of the budget.

OBSOLETE AND SLOW-MOVING UNITS

SELL THEM AND STOP LOSSES

		NET ORDERS RECEIVED											
ARTICLE	Total stk. available Jan. 1	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.

PER______________________________
Production and Service Division

EXHIBIT 6.—Watterson Company. Record of obsolete and slow-moving units.

4. The production and service division actually compiled the production schedules, using information from its own records of stock on hand, knowledge of work in process, the reports from the comptroller showing actual as against budgeted sales, and the business judgment of the director in charge of the division. If a new product was to be brought out at some time not far distant, existing products were analyzed to determine what effect the new product would have on them, and current production schedules were modified if necessary.

Another merchandising question of importance was that of determining when a product should be dropped because it no longer fitted into the company's line of products. In decisions of this kind the following divisions had a voice:

1. The comptroller's division, through comparison of actual performance against estimated or budgeted sales by product classes, could tell when the sales of certain product classes were not reaching the standards established and could recommend that an investigation be started in order to determine the trouble.
2. The sales division made the final decisions as to what items to drop and when to drop them.
3. The engineering and research division could recommend the dropping of a product if it believed that new products which were in the process of development would make existing products obsolete.
4. The production and service division could recommend that slow-moving items, and items which were likely to be replaced by new products, should be dropped. Whenever inventory records showed that certain items were moving slowly, an investigation was made by this division to discover, if possible, the causes. Monthly reports, of the form shown in Exhibit 6, were compiled by the production and service division for obsolete and slow-moving units and sent to the sales division. An effort was made to anticipate discontinuance of the manufacture of any product so that raw materials needed specially for the product could be exhausted from stock, and the purchasing department would have ample time to discontinue further purchase of such materials.

The solution of questions concerning the style of consumer products was left almost entirely to a committee in the sales division, although the engineering and research division added its suggestions when developing designs for the products, and the purchasing officer passed along new ideas on styles and materials received from vendor salesmen.

Problems of service to customers were under the jurisdiction of the production and service division. Products required for "rush" delivery were so scheduled as to speed up the manufacturing process. Products returned to the factory for repairs were received by a separate receiving department and sent to a special department of the factory which was reserved entirely for service work of this nature. In the past the company had followed the practice of sending repair merchandise through the regular production routine, but this method had been unsatisfactory. Regular production orders were worked on first, and the special repair orders were often neglected, if not entirely forgotten. In order to remedy this situation, workmen highly skilled in all types of production work were placed in a special repair department.

After a consideration of the manner in which some of the merchandising duties were performed, it could be seen clearly that there was little or no centralization of such duties. A considerable duplication of duties existed among the various major divisions. Confusion as to lines of authority occasionally arose. In some instances duties were performed in one division which could have been performed better in one of the other divisions.

The only means which had existed to obtain any degree of coordination was a weekly meeting of the five division heads. All types of problems, however, were considered at the meetings, with no special attention being given to merchandising problems as a group. Moreover, since no one at the meetings was specifically responsible for merchandising duties as a group, coordinated performance of the various duties was not possible even when all the members present were in accord.

In considering the realignment of duties necessary to centralize the performance of the merchandising function, the president of the company appointed a committee to draft a plan which could be applied to the organization of the company. This committee was composed of the executives in charge of the production and service division and the engineering and research division. It was the president's belief that these two men were more concerned with merchandising duties than were the other executives. The committee members were to investigate all available information regarding the modern development of the merchandising function; they were to visit several companies which had had successful merchandising departments in operation; and finally, after several meetings, they were to present a report describing a form of organization which they believed could be adapted to the needs of the company. Their report was to be divided into two parts: the first describing the purpose of the merchandising function and the organization of the duties necessary in the performance of the function; the second considering where the merchandising function should be placed in the company organization.

A summary of the report submitted follows:

Part I

Introduction.—Within recent years our company, as well as other industrial companies, has been faced with the elements of rapid changes and shifts in demand for industrial and consumer goods. Changes in the needs and fancies of consumers, changes in manufacturing technique, new inventions, and changes in the arts, all have worked to bring about more or less frequent alterations in the types of products.

To meet the problems of determining what to add to a line, what to discard, what to revamp, how many units to make, the development of additional uses for existing products, the determination of selling price, and the rendering of adequate service to customers, it is necessary to obtain a degree of coordination between sales and production unknown in the past. The duties involved in the work of coordination are becoming known as merchandising duties. In the history of industrial organization, one of the outstanding developments has been the splitting off of one specialized function after another. Industry in general has just now started to recognize that merchandising may be a specialized function.

If merchandising is to be recognized as a distinct function in management, the responsibility for the performance of that function should be definitely fixed. The major difficulty in our company has been that merchandising duties have not been properly centralized and thus complete coordination has been lacking.

Objective.—The objective to be achieved in the plan herein submitted is to centralize the merchandising duties in a unit which will act as a coordinating agency between the sales division and the manufacturing division. The sales division will be expected to perform all duties involved in the actual selling of the company's products, such as the control of salesmen, the methods of payment of salesmen, the division of sales territories, the thorough cultivation of old markets and the finding of new markets, and all selling relationships with customers. The manufacturing division will continue to have full control over the actual performance of manufacturing duties.

The coordinating unit will be responsible for the final action on what to produce, for ascertaining wherein the make-up of the line can be changed to gain either a substantial sales advantage or a material production economy, for the determination of what products to discontinue, for the determination of selling prices, and for all quality and service complaints.

The Suggested Plan.—The formation of any plan or method which will provide for a merchandising unit must recognize the independence and freedom to function of the other major departments but at the same time must provide for their cooperation. The method which has been used in other companies, and which seems to hold the greatest promise of success for our company, is to have a committee form of organization to perform the duties of merchandising.

A committee should be formed for each of the following groups:

1. Consumer products.
2. Educational products.
3. Industrial products.
4. Government products.

A general merchandise committee should also be formed to supervise and coordinate the activities of the four merchandise committees.

The merchandise committee in charge of consumer products should be composed of the following representatives:

1. The sales manager in charge of the sale of consumer products. This executive will be expected to furnish the committee with the sales point of view, information concerning the market, and customers' reactions to the company's consumer products.

2. The manufacturing executives in charge of the actual manufacture of the consumer products. These two executives will furnish the committee with all information concerning the facilities for manufacture.

3. The engineer in charge of the consumer product development department of the engineering and research division. This executive will furnish all technical and engineering information required by the committee.

4. The committee in the sales division which in the past has determined the style of the consumer products.

5. The chairman of the committee, who will be responsible for the development of all policies determined in the discussion of the problems confronting the committee. This chairman will be the merchandising manager for the consumer products and will conduct all activity necessary to perform the merchandising duties.

The merchandising committee concerned with educational products should be composed of the following:

1. The sales manager in charge of educational products sales, who will provide the committee with information on market conditions and transmit customers' ideas for new products to the committee.

2. One of the manufacturing executives from the educational-industrial products department of the manufacturing division. This executive will be responsible for providing the committee with all facts concerning production capacity, facilities, and the manufacturing cycle.

3. An engineer from the educational-industrial products development department of the engineering and research division, who will

furnish technical and engineering information for the guidance of the committee.

4. The chairman of the committee, who is expected to guide all activities of the committee and to perform all merchandising duties required for the educational group of products. After a discussion of any problem by the committee, the chairman will be responsible for conducting further investigation or for executing recommendations made by the committee.

The merchandising committee concerned with industrial products should be composed of the following:

1. The sales manager in charge of industrial products sales, who will provide the committee with all the necessary information concerning markets, customers' reaction to the product, and new ideas submitted by customers.

2. The manufacturing executive in charge of the educational-industrial products department of the manufacturing division, who will furnish all necessary information regarding the ability to manufacture products.

3. The engineer in charge of the educational-industrial products development department of the engineering and research division, who will furnish the committee with all information in regard to the development of new products.

4. The chairman of the committee, who will be the same individual who is chairman of the educational products merchandising committee. He will be responsible for the performance of all merchandising duties concerning these groups of products.

The authority of the merchandising committee in charge of government products will be of limited extent because of the narrow market for the products. The committee will be composed of:

1. The engineer in charge of the development of government products, who will act as chairman of the committee, but who will be responsible to the chairman of the industrial products merchandising committee for the performance of all merchandising duties.

2. The manufacturing executive in charge of the government products department of the manufacturing division.

The general merchandising committee will be responsible for the determination of the major merchandising policies; for the coordination of all sales and production; and for keeping the different lines well balanced in relation to the business as a whole. This committee should be composed of the following representatives:

1. The sales director, who will be expected to furnish the committee with all sales information.

2. The manufacturing director, who will be expected to furnish the committee with all information concerning the manufacturing equipment and facilities of the company.

3. The director of engineering and research, who will be expected to furnish all technical and scientific information relative to the company's products and any developmental work which is in progress.

4. The assistant comptroller, who will be expected to furnish the committee with all statistics and figures used for control purposes.

5. The purchasing officer, who will be expected to furnish all information in regard to materials and to pass along all ideas concerning new products, or the development of existing products, received from contacts with vendors.

6. The director of production and service, who will act as chairman of the general merchandising committee and who will be responsible for the active performance of all merchandising duties.

7. The chairmen of the various merchandising committees, who will represent their committees in the discussions of the general committee.

8. The general manager of the company.

While this report suggests that the chairman of the general merchandising committee shall be the director of production and service, this suggestion is by no means final, because the committee drafting this report is not fully convinced that its suggestion is the best from an organization standpoint. Other alternatives considered were to appoint the director of the engineering and research division or the purchasing officer chairman of the general merchandising committee; reasons for considering these executives will be discussed in Part II of this report.

The merchandising committees previously mentioned will be responsible for the performance of all merchandising duties. This means that the various major divisions will have to relinquish jurisdiction over certain duties exercised in the past. The executives of these divisions, however, will have a very definite part in determining merchandising policies, since they are represented on all merchandising committees.

The various merchandising committees will meet at least every two weeks, and oftener if in the opinion of the chairmen it is deemed necessary.

Part II

In determining where the merchandising duties should be centered in the organization, there are several factors which must be considered. The merchandising task obviously varies in different types of industry. In our company it must be remembered that many of our products are highly technical and therefore require the careful thought and attention of scientists and engineers.

The duties of an executive responsible for merchandising relate both to sales and to production. The executive in charge of merchandising should be responsible for furnishing information to the engineering and research department regarding products and improvements which will stimulate sales. While new products occasionally are the result of the inspiration of a genius, they are more commonly the outcome of organized search for the solution of the recognized problems.

If the director of the engineering and research division were to be made chairman of the general merchandising committee, he would be able to continue his active jurisdiction of what new products to produce and what changes to make in existing products. The engineers in the engineering and research division are familiar with the uses of the highly technical units which represent a large part of the company's line of products and thus know the extent of the market for such products. The reputation of the company has been built on the high excellence of products, the creation of which was solely in the hands of the engineering and research division.

On the other hand, past experience has shown that, if the engineering point of view is allowed to dominate all policies of the company, the company's products are not merchandised aggressively, and hence competition is able to make inroads on the company's sales. The engineer with a primary interest in developmental and research work has neither the time nor the inclination to know and to understand thoroughly the many problems concerned with aggressive merchandising.

The sales manager is sometimes associated with the performance of merchandising duties. Through his broad contacts with the market and with all types of customers and their problems, it would seem that he should be well able to determine what products to produce and in what quantities.

The sales manager, on the other hand, who is directly in charge of the sales force, cannot safely be entrusted with full discretion for determining merchandising policies. He usually has an inadequate grasp of the limitations imposed by factory conditions. In his desire to please customers and under pressure from his salesmen, he is continually tempted to indulge in practices which are not those to be found in sound merchandising. Moreover the sales manager is continually pressed with the active operation of his duties and has little time to adopt the reflective attitude which is essential for successful determination of merchandising policies.

The determination of what to produce requires consideration of existing and potential production facilities and as such attracts the attention of the executive in charge of manufacturing. It would not be wise, however, to allow the production manager to determine merchandising policies, since he lacks the customer's point of view and is unfamiliar with the needs and buying motives of the users of the products. He is governed more by considerations of economy and facility in production than by factors affecting the salability of the products.

The purchasing officer was seriously considered for the chairmanship of the general merchandising committee because of his intimate knowledge of the internal workings of our company, as well as his broad outside contacts. Before new products can be developed, the purchasing officer usually has to be consulted in order to obtain materials or material costs. Furthermore, he often receives ideas from his contacts with vendors which are valuable in the development of new products and, unless he is so placed in the company organization that his views and the ideas he receives will be recognized and incorporated into merchandising policies, the full advantage of his position is not gained by the company. Moreover in such merchandising decisions as the determination of the quantity to produce, the purchasing officer is directly concerned because he is responsible for providing the raw materials; also, when products are to be dropped from the line, he must know immediately in order that the purchase of materials used in the product to be dropped will be discontinued promptly.

On the other hand, there are certain inherent disadvantages in having the merchandising duties centered under the purchasing officer. The added duties involved in the performance of the merchandising function would detract from the active duties required in procurement of the materials and equipment required in the operation of the company. Such detraction might impair the efficiency of the operation of the purchasing function. An assistant to the purchasing officer would have to take over many of the duties previously performed by his superior, thus virtually becoming the purchasing officer. The committee writing this report believes that there is much to be said for placing the purchasing officer in charge of merchandising and suggests that the executives consider this possibility before making a final decision.

The director of production and service is suggested as chairman for the general merchandise committee because it is believed that the centralization of merchandising duties will fit in well with his existing duties. One of the chief aims in the proper performance of the merchandising function is to reduce the investment in inventories and to provide against the piling up of obsolete products in inventories. The present director of production control is well qualified by training and past experience to assume the responsibilities arising out of the centralization of merchandising duties. His duties in the past have necessitated that he act, in some degree at least, as a coordinating link between sales and production. As chairman of the general merchandising committee he will have the responsibilities and authority which are essential for the complete coordination of sales and production.

The greatest weakness in having the director of production and service also chairman of the general merchandising committee lies in the fact that the executive in charge of merchandising should have definite contact with the market in order to develop a proper appreciation of the forces and factors present in the distribution of the company's products. This weakness can be corrected, however, by having the chairman of the general merchandising committee make periodic trips to visit jobbers, retailers, and users of the educational and industrial products.

The chairmen of the individual merchandising committees, with the exception of the committee for government products, should be appointed from either the sales division or the inventory control division. Opportunity should be afforded to these executives to maintain or obtain market contacts in order to insure a proper appreciation of the market in the determination of merchandising policies.

The committee appointed to study the merchandising function recommends that the plan for centralizing merchandising duties be adopted. While it is true that our company has been remarkably successful in the past and is at the present time under the existing form of organization, in which merchandising duties are scattered among several major departments, it is, nevertheless, a fact that success obtained without the best possible organization is in spite of it and not because of it. We firmly believe that the suggested change will strengthen materially our company organization and will enable our continuance as the outstanding manufacturer in our line.

9. SEWELL MANUFACTURING COMPANY

PURCHASING FOR EMPLOYEES

For many years prior to 1931 the Sewell Manufacturing Company had allowed its employees to purchase commodities for their personal use from wholesale dealers by charging the goods to the company. The employees then paid the company through deductions from their weekly pay, not more than $5 being deducted from the pay of any employee in any one week. By this method the employees were able to buy at wholesale prices a wide variety of merchandise, with the exception of food and clothing, and to obtain an extension of credit on the purchases.

The Sewell Manufacturing Company employed approximately 600 men and women in its plant and office. Every employee was eligible for the purchasing privilege provided that he submitted his request to the employees' department, which was in charge of the plant and office personnel, and received an order from that department to the dealer supplying the type of merchandise desired. The employees were requested to make their own selection of the merchandise, but the employees' department noted on the order the class of merchandise and the number of items which might be purchased, thus restricting the size of a purchase which an employee might make at any one time. For instance, if an employee wanted an electric iron and a toaster, the notation on the order was for "one electric iron and one electric toaster as selected." This order then restricted the employee to the purchase of the two items at that time and also served as an identification of the employee to the electrical supply dealer. On the order form was a notation that the items were to be charged to the Sewell Manufacturing Company.

Two copies of each employee order were made. One was kept in the office of the employees' department with the records of payments which had been made on previous orders and of accounts outstanding against the individual employee. The second copy was sent to the purchasing officer for checking against bills submitted to the company. Although the employees' contacts were with the employees' department, the purchasing officer made the arrangements with dealers to grant the discounts. The employees' department received instructions from the purchasing officer as to where the employees were to be sent to purchase particular commodities.

The Sewell Manufacturing Company was located in a town of approximately 5,000 inhabitants, 20 miles from a large city in New England. There was only one other large manufacturing company in the town, and consequently the employees of the Sewell Manufacturing Company provided an appreciable portion of the earning power from which the local retail merchants received their business. Because of the proximity of the town to the city, the major portion of the local retail trade was in food and clothing. The stores in the city were able to provide a better variety of merchandise and better service on such lines as furniture and household appliances than were the stores in the town. The purchasing officer of the company had gone to the city, therefore, to make arrangements for the employees to purchase such merchandise. While he had never aggressively sought a large number of dealers to grant this privilege, he had made satisfactory arrangements with eight wholesalers offering a wide line of goods who had agreed to sell to the employees of the Sewell Manufacturing Company at the prices regularly charged to retail dealers. Inasmuch as the business thus gained by the wholesalers represented an increase in their total volume without the incurring of any additional expense, the purchasing officer had encountered little difficulty in making arrangements. Furthermore, since the items were billed to the Sewell Manufacturing Company, the credit risk on such business was negligible. These arrangements with wholesale dealers were made only for merchandise which the company did not buy regularly for use in the plant or the office.

On items which were used both by the company and by the employees in their homes, such as wood, paint, bricks and other building materials, and automobile tires, the purchasing officer had effected arrangements with the dealers from whom the company made its purchases to supply the employees at wholesale prices. The company bought about 20 cars of bituminous coal a year directly from the mines, screened it at the plant, and supplied to the employees the part which was not suitable for use under the boilers at the plant but which was suitable for domestic use. The cost of this coal to the employees included the original cost, the cost of screening, and the delivery costs. This price represented a saving of more than 50% of the usual retail prices of bituminous coal for domestic use. The employees' purchases of coal had increased until in the season of 1929–1930 they amounted to approximately $4,500. During 1930 the employees had purchased automobile tires to the extent of $2,500.

In addition to the purchases of such merchandise from wholesale dealers, the employees were allowed to purchase the products of the Sewell Manufacturing Company at the manufactured cost plus a markup of 5% to cover the clerical and storage expenses. These products included a variety of cotton goods, such as gauze bandages, cheesecloth for various purposes, and sanitary supplies. Payment for these products also was made by deductions from the weekly pay roll.

Dealers generally were entirely willing to sell to the employees of the Sewell Manufacturing Company at wholesale prices. In 1929, for instance, the tire distributor who for two years had been selling to the Sewell Manufacturing Company and its employees met the complaints of the owner of a near-by garage, who was one of his customers, by stating that he sold the first grade of tires to the Sewell employees, whereas the garage had stocked the second grade in the past. He stated further that, by securing a majority of the employees' orders for tires, he sold as many tires to them in three months as he had sold to the garage in any year; and that he received payment for the tires within ten days after a shipment, whereas he waited from a month to six months for payment from the garage.

At the beginning of 1931 the purchasing officer of the Sewell Manufacturing Company decided that the employees' orders had caused the company greater expense and effort than was justified by the employee goodwill the company gained through this service. The actual cost of performing the service had been small because the regular purchasing department had been able to take care of the employees' orders, and no increase in the staff of the employees' department had been required to take charge of the records there. On the other hand, the practice of having employee purchases billed to the company and paid by the employees in small installments had caused the company to carry from $3,000 to $4,000 on its books most of the time as "accounts receivable from employees." Although in paying the bills on these purchases the company had usually taken advantage of an average cash discount of 2%, an advantage which was not passed on to the employees, the discounts were not enough to pay for the carrying charges on the accounts receivable from employees. The employees' department considered it inadvisable to increase the size of the deductions to be made from the employees' weekly pay in order to lessen the time required for the payment on any one purchase. The average weekly pay in the plant and the office was not more than $25. The purchasing officer was convinced, furthermore, that the employees had found the purchasing privilege advantageous more for the credit that was extended to them than for the actual savings in prices. This was contrary to his belief that the value of the employee purchasing program should come from the feature which amounted to an increase in salaries and wages rather than from the incentive for employees to buy many goods for which they could not pay immediately.

In March, 1931, therefore, the purchasing officer made a change in the purchasing procedure for employees. He made a rough division of the merchandise to be purchased for personal consumption into two classes: necessities and all other merchandise. The significance of the term "necessities" was vague, but the class included in general the merchandise which was required for construction and maintenance of the home, such as building materials and coal. In this class were those items which the company purchased regularly for use in its plant and office, and under this heading automobile tires were included. For future purchases of necessities by employees the former credit plan was to be continued; that is, the goods were to be billed to, and paid by, the company, with employees paying by weekly deductions from their pay. There was no set maximum on any individual order to be placed for an employee. The employees' department believed that the company had received far more goodwill from the employees through granting the privilege of purchasing the necessities with large savings over retail prices than from the privilege of purchasing the other lines of merchandise.

For purchases of merchandise other than necessities the purchasing officer decided to extend no credit to the employees, but rather to have them pay cash to the dealers or arrange their own credit terms at the time of purchase. Under this method, an employee was to receive from the employees' department an order form which would serve primarily as an introduction to the dealer. Each order was to call for no specific items but merely items as selected by the individual. In this way the restriction of the size of a purchase was removed, since the employee rather than the company was responsible for the credit and the ability to pay. The order form for such purchases bore the statement in large print: "Bearer will pay cash for this merchandise. No charge is to be made against the Sewell Manufacturing Company." While the order called for cash payment, this statement was merely for the protection of the company. If the dealer from whom the employee purchased saw fit to grant credit to the individual, the company made no objection.

When this change in the purchasing privilege was put into effect in March, 1931, no notification of the change was issued to the employees in the plant and the office. When an employee asked the employees' department for an order for merchandise outside the necessity class, he was informed that the company no longer granted credit on such merchandise and that he must pay cash to the dealer or arrange his own credit terms. In no case during the first four months of the use of this plan did an employee make a serious objection to the change. Whereas in 1930 the employees had purchased approximately $3,000 worth of merchandise in this classification, such as electrical appliances and household furniture, during the first four months under the new plan the employees' department issued only 30 cash payment orders, of which the total value probably did not exceed $250. This fact substantiated the purchasing officer's belief that what the employees had been seeking was credit rather than actual savings in prices. The absence of a set maximum on employee purchases of necessities had not caused difficulty since no request had been received which amounted to an unreasonable sum.

10. FARLIN COMPANY

PURCHASING FOR EMPLOYEES

During the summer of 1931 the purchasing officer of the Farlin Company, a manufacturer of men's, women's, and children's high-grade hosiery, asked for an official statement from the management of the company concerning the advisability of purchasing personal and household requirements for the employees. The question of employee purchasing was one of company policy upon which the purchasing officer did not have authority to make a decision without the sanction of the managing owners of the company. During the 50 years of its existence the Farlin Company had not allowed its purchasing officer to buy, or to arrange for the purchase of, personal requirements for the employees. While employees' inquiries at his office as to the possibility of receiving this service had been very infrequent, and the problem was therefore not of pressing importance, the purchasing officer wished to receive an official statement concerning the policy to be followed in this connection.

The Farlin Company employed approximately 1,500 men and women at its four plants. One plant was located with the general executive offices in a town of 7,500 inhabitants, about 10 miles from a large city in New England. The Farlin Company was the largest industrial organization in the town and employed 600 people in its plant and offices. Of the remaining three plants, one was located in another city in New England about 100 miles distant from the home office, and the other two were located in the South in two cities separated by 350 miles. Each of these three plants employed about 300 men and women. In addition to these plants the company maintained sales offices in seven cities throughout the United States employing 75 salesmen. The annual sales of the Farlin Company were slightly in excess of $5,000,000.

The purchasing of all requirements for the four plants was centralized under the purchasing officer at the home office. All requests for supplies at each of the three scattered plants were submitted by the superintendents of the respective plants to the purchasing officer. Exceptions to this policy were allowed only in cases of emergency demands for such items as bolts or springs for repairing machinery. The purchasing staff at the home office consisted of the general purchasing officer, a buyer who specialized in the purchase of yarns, and three clerks.

Although he lacked evidence, the purchasing officer of the Farlin Company estimated that, if his office should undertake to purchase personal requirements for employees of the company, it would necessitate at least two more clerks, at an additional direct cost of at least $2,500 a year. The executives believed that the added work would require one-half the time of two other clerks, one in the billing department and one in the pay roll department. The total direct clerical costs which would be incurred by employee purchasing would amount to at least $4,000 a year. Other direct costs would arise from the use of special printed forms as requisitions for personal requirements.

The foregoing estimate of increased costs to be expected did not take into account the work which would have to be done in establishing arrangements with wholesale and retail dealers to sell to the employees of the Farlin Company at discounts from retail prices. Such work in connection with a program of purchasing for employees at the home office and its adjacent plant would require personal interviews by the purchasing officer, whose time was already filled by his regular duties.

The executives of the company believed that, if the privilege was extended to the employees at any one of the plants, it should be extended to the employees at all plants. Two methods of purchasing for the employees at the outlying plants were considered by the executives. Since the purchasing for all plants was centralized at the home office, it might be possible to delegate to the pay roll clerk at each of the plants the responsibility of submitting to the home office all requisitions for merchandise for employees at his plant. Such a procedure would require arrangements for discounts only with vendors in the vicinity of the home office. On the other hand, this plan would result in considerable delay in putting the merchandise in the hands of the employees; a danger of confusion as to the exact descriptions of the articles wanted and therefore the probable necessity of definitely limiting such purchases to highly standardized products; the addition to the price of the merchandise of the cost of shipping from the home office to the point of requisition; and, in the event of dissatisfaction with the merchandise delivered, the trouble and expense to either the employee or the company of returning the merchandise. The executives believed that if such a plan was adopted, there would be little incentive for the employees at the outlying plants to make use of the privilege.

The alternative plan under consideration was that of making arrangements for the employees at the outlying plants to purchase at less than retail prices from vendors in the vicinities of their respective plants. Since the company employed no purchasing officers at those plants, the adoption of such a plan would require the purchasing officer or some representative from his department to visit the vicinity of each plant to make arrangements with the vendors. If this plan was adopted, an immediate difficulty might be the lack of incentive for vendors in those localities to grant discounts to the employees of the Farlin Company. The executives of the company believed that the only reason that vendors might accede to a request for discounts would be the fear that otherwise they would lose their regular business with the Farlin Company. Since the outlying plants of the Farlin Company did no purchasing except in cases of emergency, it was probable that requests for discounts in these districts would hold little incentive to the vendors.

Granting that it might be possible to make the necessary arrangements with the vendors in the vicinities of the outlying plants, the executives believed that this second plan would cause a danger of credit difficulties on the employees' accounts. The executives believed further that to be of the most benefit to the employees the plan would have to allow the employees to charge merchandise to the company and to pay the company in small installments. The executives were of the opinion that it would be unwise to allow employees to place orders for less than $5 each because of the high proportion of clerical costs which would accrue to any orders under that amount. It was expected, furthermore, that the major portion of the demand would be for such items as electrical appliances and house furnishings, and that the value of such orders would run from $10 upward. The purchasing officer would make no attempt to arrange for discounts on food or clothing for the employees. Since the average weekly wages of the plant employees were not more than $25, prompt payment for such orders would be uncertain if the goods were billed directly to the employees. An alternative plan would be to deduct the amount from the employees' wages for the week following an individual order. Such a deduction would comprise so large a proportion of the wages for any one week, however, that this plan would limit seriously any incentive for employees to use the privilege. The employees of the Farlin Company were paid each week, a check being sent from the home office to the pay roll clerks at each plant, from whom the employees at the respective plants received their individual wages. Deductions of payments for merchandise, therefore, would increase the danger of errors in the pay roll department of the company.

If the company were to allow someone in the outlying plants to supervise the employee purchases of the respective plants, that person would be required to report to the home office each week all purchases made during the week. This responsibility might be delegated to the plant superintendent. A more satisfactory procedure from the viewpoint of the management would be to have employees' purchases controlled by the personnel department at the home office. From the viewpoint of the employees, however, this plan was unsatisfactory since the necessity for approval of an order from the home office would require considerable time and "red tape."

For many years the employees of the Farlin Company had been allowed to purchase the products of the company at the list prices regularly charged to retail stores. Stocks of this merchandise were maintained at the home office, and employees' requisitions were submitted by the superintendents of the plants to the home office. After going through the order department and the shipping department, the requisitions were submitted to the pay roll department in order that the charges might be recorded against the respective employees' accounts. A change in the policy of employee purchasing of the company's products was not contemplated.

The executives of the company considered the obstacles that the home office and its adjacent plant would face in a plan for employee purchasing as examples of further difficulties which would be encountered were the plan extended to include the other plants. As a major obstacle the executives anticipated serious objections from the local retail merchants since the employees of the Farlin Company represented an appreciable proportion of their potential customers. The executives doubted that satisfactory arrangements for discounts to employees could be made with the local vendors. Despite the objection of the local dealers to such a procedure, it might be possible to make such arrangements with vendors in the near-by city. The executives believed, however, that for the employee purchasing plan to function well it would be advisable to have the employees make their own selection of the merchandise desired in as many cases as possible, and it was very seldom that the plant employees had an opportunity to go to the city for a personal selection of goods.

The executives of the Farlin Company feared that a plan whereby the employees received appreciable discounts on personal purchases might be subject to abuse by the employees. It was likely that those who used the privilege might also make purchases at discounts for friends and neighbors who had no connection with the Farlin Company. If such purchases were made for nonemployees, there would be increasing reason for complaints on the part of the local merchants.

The executives recognized the generally accepted theory that granting to employees the privilege of buying at discounts through the purchasing officer constituted a wage increase equivalent to the size of the discounts available, and that such a plan was, therefore, an effective means of strengthening the employees' goodwill toward the company. The Farlin Company had never had any serious difficulty with its labor in connection with its wage rates. The company had an excellent reputation for its fairness in all matters concerning the labor force without having undertaken extensive programs, such as the establishment of recreation facilities. The executives believed that the purchasing privilege would not be recognized generally by the employees as an increase in wages, but that, on the contrary, if an employee thought he should receive an increase of 10% in his wages he would continue to seek that actual increase even after having received the privilege of buying household and personal supplies at discounts which might range from 5% to 40% of the usual retail prices.

The executives of the Farlin Company transmitted to the purchasing officer a statement to the effect that the policy of refusing to purchase personal requirements for the employees would be continued.

SECTION II

PURCHASING PROCEDURE

11. ELECTRA CORPORATION

PURCHASING ORGANIZATION AND PROCEDURE

During 1927 the Electra Corporation was formed as a holding and managing enterprise for seven companies manufacturing electrical household appliances, industrial electrical equipment, insulators, electric motors, elevators, and radios. The purpose of the consolidation was to unify the various companies in order that they might benefit from the advantages and economies of large-scale operation. It was anticipated that one way in which economies would be developed by the unified management was through the centralization of purchasing. The executives realized, however, that many problems would arise in any attempt to centralize purchasing. The company's plants were scattered over a wide area, and many plants manufactured products which required types of materials, supplies, and equipment not used in any other plant.[1]

Realizing that the problem was a complicated one, the president appointed a committee, consisting of representatives from the purchasing departments of all the interested companies, to draw up a plan for the centralization of all purchasing activities. After considerable study, the committee transmitted the following report:

Report on Purchasing Function

1. A central purchasing office shall be established under the direction and control of a director of purchases, and all buying for the entire company shall be under the direction of this office.

Duty of Director of Purchases

2. The director of purchases will supervise and direct all purchasing for the entire company. He will be responsible for and sign all contracts.

Local Buyer, or Head of Stock Control or Head Storekeeper

3. The local buying of emergency items for individual plants will be under the direction of the individual plant managers but

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[1] See Case 7, Carlyle Machinery Company, p. 48.

handled by the local buyer in case we have one in certain plants or by the head of stock control or stores department in the individual plants. These emergency purchases are to be limited to $100. In cases where it will be more convenient, the local buyer or whoever handles the emergency purchases for the local plants may be given authority to send out local purchase orders to apply on contracts that are made in the central office. In the case of all local purchase orders that are issued, a copy must be sent to the central purchasing office so that the purchases may be reviewed by the buyers in that office. A copy of each local purchase order is to be mailed the same day it is written.

General Operating Plan

4. Various commodities will be divided into classes and delegated to certain assistant buyers, whose duty it will be to work up necessary information and obtain prices for contract propositions in cases where the volume is sufficient for a contract. When this material is assembled, the propositions are to be submitted to the director of purchases for his approval. In case the director of purchases is not satisfied with the proposals received, he will have a further investigation made as to sources of supply where it may be possible to obtain better propositions. Many contracts will be made without obligating the company to any specific quantity. When contracts are made for materials used in several plants, a list of the plants will appear on the contract papers. Vendors will be instructed that no shipments are to be made on contracts until they receive formal purchase orders. In cases where contracts are made and the central purchasing office decides that orders may be sent out by the local plants to apply against the contracts, the central purchasing department will inform the local plants involved of the contracts and procedure. The central purchasing department will keep an accurate record of all contracts, showing the quantity specified and the quantity due, the date of the contract, and the expiration. The duration of contracts is to be determined by the central purchasing department in accordance with market conditions and the various plants' requirements.

5. It is recommended that the engineering or metallurgical department issue specification cards for all standard production material, as well as supplies. A set of these cards will be kept in the engineering or metallurgical department, another in the stores department, and a third in the central purchasing office. In the case of a change in specifications, the engineering or metallurgical department will notify the parties concerned; and the stores department, upon receipt of such notice, will notify the central purchasing office in case there are any outstanding orders on which the material has not yet been made up so that the change can take effect immediately.

6. The stores and inventory control of purchased raw material and supplies shall be under the supervision of the plant managers and delegated by them to the proper authority at each plant. Inasmuch

as the plant managers are fully informed as to the production schedules, they are well able to control the quantities of raw material and supplies to be purchased and carried in stores.

7. Since the stores department is closely related to the buying department, it is important that all plants adopt a standard system of carrying their stock of raw material and supplies, and the symbolization of this stock, so that any item used by the various plants will be carried under the same stores symbol with a letter preceding the symbol, designating the individual plant.

8. It will be the duty of the central purchasing office to notify the various plants of the time required for the delivery of various commodities and to keep the plant managers informed as to changes that take place, so that the stores may be regulated up or down in accordance with business conditions.

9. Requisitions for standard stores, either raw material or supplies regularly carried in stock by any of the plants, will be originated by the general storekeeper of each individual plant according to the plan of storekeeping laid down by the general manager of the plant.

10. Only one item is to appear on any one purchase requisition on standard items of stores that are carried regularly in stock. In the case of special items, such as plumbing fittings that are not carried regularly in stock, several items may be covered by one requisition provided they are items that are likely to be purchased from one vendor and that they are for delivery at the same time.

11. When the quantity of material on hand in any plant is reduced to the ordering point, an investigation will be made as to whether or not the standard quantity set up on the records is to be reordered at that time or held up, according to the production schedule, to be ordered later, or whether the item is to be maintained as a standard item or become obsolete. After a full investigation, at the proper time a purchase requisition is to be sent through to the central purchasing office.

12. In the case of unclassified material not regularly carried in stores, the requisitions may be originated in any plant by anyone in the organization authorized to make out requisitions. All such requisitions after being properly O.K.'d will be routed through the general storekeeper's office in each individual plant, which will check the requisitions to see if anything is carried in stock that can be substituted. In case the item is to be purchased, the requisition will be recorded in the plant stores department under an unclassified stores number and the symbol then forwarded to the central purchasing office. These requisitions should contain complete information as to what is required.

13. Purchase requisitions for machinery and equipment must show the authorization and the capital account number, also the signature of the individual plant manager.

14. Purchase requisitions for classified stores carried regularly in stock will show the name and number of the plant; the stores symbol and the comptroller's account symbol; the quantity required, the size, and a brief description of the commodity; the date the material is

required, and the department number, the requisition number, and the last order number; the amount on hand, the amount on order, and the quantity used in the past three months. The general storekeeper of each individual plant will make a list in duplicate of the requisitions sent each day, or at any one time, and will send one copy of the list to the central purchasing office. When the requisitions are received in the central purchasing office, it will time-stamp them and sign its copy of the list and return it to the storekeeper. This will be his notification that the requisitions so listed have been received by the central purchasing office, and in case any requisitions shown on this list are missing the storekeeper will be notified.

15. Upon receipt of the requisitions in the central purchasing office after being time-stamped, all requisitions are turned over to the order typist or clerk, who will have charge of all the specification cards and who will attach the proper specification card to each individual requisition, being careful to see that the proper card is attached to the requisition according to the symbol given and the size. The requisitions are then turned over to the buyer, who will immediately mark up all contract items, showing the name of the firm with which the order is to be placed, also the word "contract" on the requisition, the price, the terms, the f.o.b. point, the total value, and the payment date, for the comptroller's information. The requisitions will then be turned back to the order typist, who will type the order, after which it will be carefully checked with the specification card, the price, terms, etc., before the order is finally mailed to the vendor.

16. When items are not covered by contract and therefore carry no price agreement, inquiries will be dictated or sent out on standard inquiry blanks provided for this purpose. In cases where inquiries are to be used, a list of the names of vendors to whom inquiries are to be sent will be written on the back of the requisitions. The requisitions will then be turned over to the typist, who will make out standard inquiry forms and turn them over to the buyer, who will check and sign before mailing.

17. A quotation sheet will be filled out and attached to the requisition, which will show the date, vendor's name to whom the inquiry is sent, the list price, discount, net price, f.o.b. point, and cash terms.

18. In case the quotations are not received as promptly as required, the request will be turned over to the buyer for follow-up according to the plan required, that is, by mail, telegraph, telephone, etc.

19. When the quotations are received from the various vendors to whom the inquiries are sent, the quotations will be marked up by the clerk designated to do this work and then turned over to the buyer, who will determine the vendor with whom the business is to be placed. The buyer will show on the requisition the total value and the payment date. He then initials it and turns it over to the order typist, who will type the order.

20. When the order is typed, it will show the vendor's name and address; quantity, specifications, and price; f.o.b. point, terms, and

delivery date; account number and symbol, stores symbol, and plant number; method of transportation and the routing; the date the material is to be shipped, the date it is required to reach the plant, and the date of the vendor's quotation. The following clause is to appear on every purchase order issued: "The payment, by the buyers, of any bill under this contract [or order as case may be], before actual inspection and acceptance of goods, shall not waive any of the buyer's rights under this contract." At the same time, the order typist will enter the record of the order on the specification card, filling out the information completely as provided for on this card.

21. Each purchase order form consists of seven copies, which are distributed as follows:

22. Original to the vendor, two copies for the central purchasing office, and one copy each for the receiving department, accounting department, general storekeeper of the individual plant, and the comptroller.

23. The original copy of the order, with acknowledgment stub attached, is mailed to the vendor. The central purchasing office copies are placed on file, one alphabetically by vendor, and the other in a tickler file under the date the acknowledgment should be received from the vendor. In case the acknowledgment stub is not received according to the time allowed, the first follow-up is for the acknowledgment. The date of this follow-up is noted on the tickler copy. When the order is acknowledged, the tickler copy is again filed, this time under the date shipping advice should be received.

24. The delivery will then be followed up in accordance with the time the material is required by the various plants, it being the duty of the buyer to obtain delivery of satisfactory material to meet the plants' requirements. The plants are to be notified in case there is going to be any delay in delivery, on a form drawn up for that purpose. In case the delivery date promised by the vendor is not satisfactory, the buyer is to obtain the material elsewhere or a sufficient quantity to keep the plants supplied.

25. All invoices are to be mailed by the vendors in duplicate to the accounting department of each individual plant to which the material is shipped; and, since the purchase orders show complete information as to price and terms, the invoices may be passed by the accounting department, provided they check with the purchase order. If they do not agree, the accounting department cannot pass the invoice for payment until it has obtained authority from the central purchasing office, expressed on a special form provided for this purpose and submitted to it by the accounting department. All invoices are to be checked in the accounting departments. When an emergency order is placed without a price being stated and the accounting department receives the invoice for the goods before the central purchasing office has obtained the price, then the accounting department refers the price to the central purchasing office on a special form and will not pass the invoice until it receives authority.

26. A daily report of invoices received is to be rendered by each accounting department to the central purchasing office and also to the person in each local plant who is responsible for local purchasing.

27. A daily report of goods received is to be rendered by each individual plant to the central purchasing office and also to the person in each local plant who is responsible for local purchasing.

28. Any change of price, specification, or quantity will be put through in the regular way by a form drawn up for this purpose and sent to the various parties concerned, but it must be O.K.'d by the buyer in charge of purchasing the commodity involved.

29. It will be the duty of the central purchasing office, as well as of those individuals in each plant who make local purchases, to send the copies of the purchase orders to the various parties for whom they are intended on the same day the order is written.

30. For the information of the comptroller's office, the comptroller's copies of orders are listed at the close of each day showing the order number, the comptroller's symbol, total value of the order, and the vendor's name. These lists, together with the comptroller's copies of the orders, are to be sent each day to the comptroller's department.

31. It is necessary that the central purchasing office keep in close touch with all the plants and lay down a policy regarding over- and undershipments. On volume items that are ordered in pounds, except very expensive items, there is to be usually an allowance of 10% over or under.

32. Testing materials. Through the buyers' contacts with the vendors, materials or parts are likely to be offered that may be an improvement on, or more economical than, the material that is being used; and in such cases the buyers are to authorize sample shipments, which when received are to be sent through the regular channels in the factory organization for test. A test sheet should be made out, showing the size and kind of material, the vendor from whom it has been ordered, and the price, as well as the present source of supply and the price. When the test is completed, the information regarding the material and the results of the test should be written on these test sheets, and a copy forwarded through the various channels for approval or disapproval, in accordance with the results and the comparative costs. It should be generally understood that a change in specifications will not be made on production material before the material is approved by the individual plants. Our policy on samples will be that they are not to be paid for unless satisfactory, and this statement will be written on the purchase order.

33. When the individual plants requisition small quantities often, and it is necessary to pay large extras to obtain small quantities, and the year's usage is sufficient to eliminate the quantity extras, the buyers will recommend to the general manager of plants, or the local plant manager involved, that the quantities be increased to eliminate expensive quantity extras. In cases where the individual plants requisition large quantities and the market price is on a decline, the central

purchasing office will recommend to the plant manager that the quantity be cut down and kept as low as possible until such time as the market price warrants buying regular quantities.

Advertising Department

34. It is requested that the advertising department give its purchase requisitions to the central purchasing office sufficiently in advance to enable it to buy the material required at the lowest possible price.

Sales Department

35. Standard articles and supplies used regularly by the sales office will be purchased through the central purchasing office. Miscellaneous items that can be obtained locally for convenience and on account of reciprocal relations should be purchased by each individual sales office.

36. The buyers will make every effort possible to assist the sales departments to sell the vendors from whom purchases are made. Information will be accumulated showing volume of purchases from all vendors, particularly on major items.

37. A selection will be made of trade papers and magazines to keep the buyer well informed as to market conditions.

38. The vice president in charge of the marketing division should notify the central purchasing office of all changes in planned sales and of all changes in models which might in any way affect materials on order.

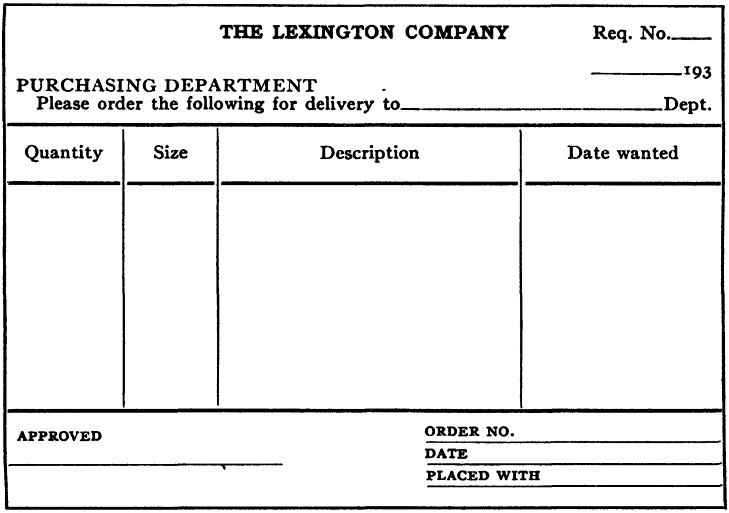
39. It is specifically requested that each and every person that has anything to do with purchasing, as well as all individuals in all plants and offices who may have knowledge of prices that are being paid and the sources of supply, positively refrain from giving out to any salesman or vendor information as to the prices that are being paid or as to the sources of supply.

12. LEXINGTON COMPANY

PURCHASING PROCEDURE

The Lexington Company, a manufacturer of textile weaving machinery, had developed a completely centralized purchasing routine for the purpose of insuring prompt delivery of materials. Since it manufactured machinery to order and purchased certain of its materials only after the receipt of an order, satisfactory operation of the company was dependent upon prompt delivery.

In 1929 the Lexington Company's total purchases amounted to $800,000; the items purchased included pig iron, scrap iron, steel, hardware, maintenance supplies, foundry supplies, fuel, power, and lumber. Although the purchasing officer had authority over the stores department, he delegated much of his authority to the head storeskeeper, whom he made responsible for keeping the inventory record and for maintaining adequate supplies.



THE LEXINGTON COMPANY Req. No.____

__________193

PURCHASING DEPARTMENT
Please order the following for delivery to____________________Dept.

Quantity	Size	Description	Date wanted

APPROVED

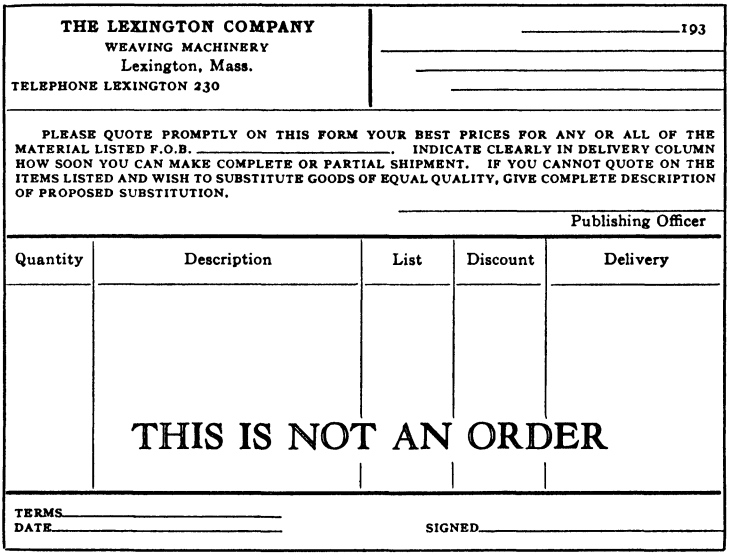
____

ORDER NO. ________________
DATE ________________
PLACED WITH ________________

EXHIBIT 1.—Lexington Company. Requisition.

When the storeskeeper found that materials were needed, he made out a requisition in duplicate, using the form shown in

Exhibit 1. He then sent the original to the purchasing department for approval and retained the duplicate. When special conditions demanded a rush order, he filled out in duplicate a requisition having the same form as, but a different color from, the regular requisition; the original was sent to the purchasing officer and the duplicate retained. In order to insure that the rush requisition was used only in cases of emergency, the purchasing officer made a prompt investigation of the reasons for such requisitions whenever a number of them were issued within a short period of time.



THE LEXINGTON COMPANY
WEAVING MACHINERY
Lexington, Mass.
TELEPHONE LEXINGTON 230

______________193

PLEASE QUOTE PROMPTLY ON THIS FORM YOUR BEST PRICES FOR ANY OR ALL OF THE MATERIAL LISTED F.O.B.______________. INDICATE CLEARLY IN DELIVERY COLUMN HOW SOON YOU CAN MAKE COMPLETE OR PARTIAL SHIPMENT. IF YOU CANNOT QUOTE ON THE ITEMS LISTED AND WISH TO SUBSTITUTE GOODS OF EQUAL QUALITY, GIVE COMPLETE DESCRIPTION OF PROPOSED SUBSTITUTION.

____
Publishing Officer

Quantity	Description	List	Discount	Delivery

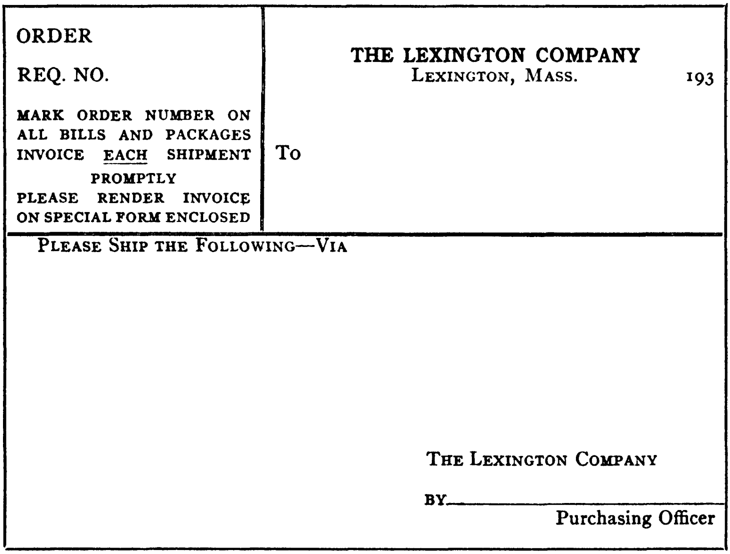
THIS IS NOT AN ORDER

TERMS______________
DATE______________ SIGNED______________

Exhibit 2.—Lexington Company. Request for quotations.

Upon receipt of a requisition properly filled out, the purchasing officer was in a position to obtain prices. A "request for quotations" form, shown in Exhibit 2, was filled out and mailed to those vendors thought capable of supplying the needed material. When materials were purchased at regular intervals or when their prices remained stable, the purchasing officer gave the orders to one or two suppliers who had proved reliable in the past, without obtaining prices from other vendors. Prices were secured by mail or through vendor salesmen calling at the plant.

When the purchasing officer had decided which vendor or supplier was to receive the order, a purchase order, shown in Exhibit 3, was made out in quadruplicate. This order contained full shipping instructions and specifications for the material to be supplied. All copies were identical, except in color and except for the fact that the fourth copy had the consecutive numbers 1 through 31 printed across the top. The original, white in color, was sent to the vendor as an authorization of the order; the duplicate copy, yellow, was retained by the purchasing officer for his reference files; the triplicate copy, blue, was sent to the receiving clerk to await arrival of the material; the quadruplicate, pink, was sent to the accounting department. The numbers printed across the top of the fourth copy represented the days of the month, and when the purchasing officer later received the vendor's invoice the proper number was checked to indicate the discount date.



ORDER

REQ. NO.

MARK ORDER NUMBER ON ALL BILLS AND PACKAGES
INVOICE EACH SHIPMENT PROMPTLY
PLEASE RENDER INVOICE ON SPECIAL FORM ENCLOSED

THE LEXINGTON COMPANY
LEXINGTON, MASS. 193

To

PLEASE SHIP THE FOLLOWING—VIA

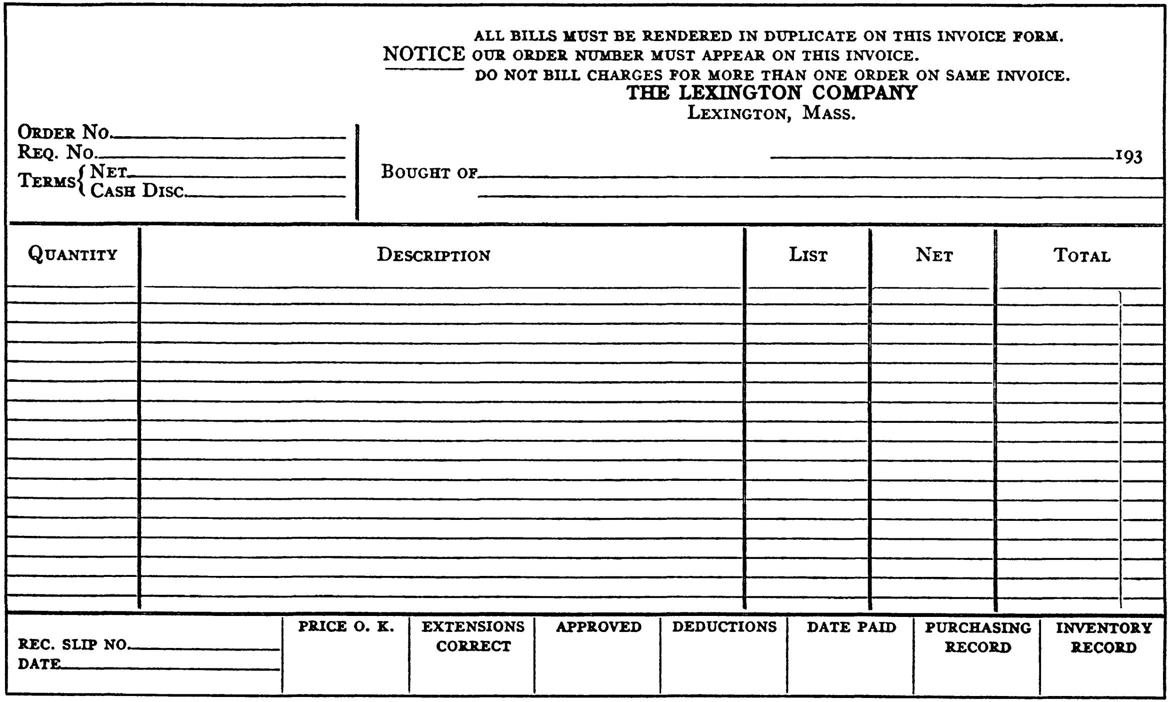
THE LEXINGTON COMPANY

BY

Purchasing Officer

EXHIBIT 3.—Lexington Company. Purchase order.

A standardized invoice in duplicate, the form of which is shown in Exhibit 4, and an acknowledgment card, shown in Exhibit 5, were included with the purchase order sent to the



NOTICE ALL BILLS MUST BE RENDERED IN DUPLICATE ON THIS INVOICE FORM.
OUR ORDER NUMBER MUST APPEAR ON THIS INVOICE.
DO NOT BILL CHARGES FOR MORE THAN ONE ORDER ON SAME INVOICE.

THE LEXINGTON COMPANY
LEXINGTON, MASS.

ORDER NO.________
REQ. NO.________
TERMS { NET________
CASH DISC.________

________193

BOUGHT OF________

QUANTITY	DESCRIPTION	LIST	NET	TOTAL

REC. SLIP NO.____ DATE____	PRICE O. K.	EXTENSIONS CORRECT	APPROVED	DEDUCTIONS	DATE PAID	PURCHASING RECORD	INVENTORY RECORD

EXHIBIT 4.—Lexington Company. Standard invoice.

THE LEXINGTON COMPANY
Lexington, Mass.

Acknowledgment of Order No.__________

Kindly fill out, sign and return. State definitely date of shipment.
"Promptly," "Soon as possible," "At once," will not answer our purpose.

______________________193

We will ship your order as follows:

____

____

____

Signed ______________________________

Our records will not be complete without the return of this slip.

Exhibit 5.—Lexington Company. Acknowledgment card.

Instructions to Messenger
from
THE LEXINGTON COMPANY

Date..........................

Call at..........................

Street..........................

When..........................

Ask for { MR. / MISS / MRS. }..........................

Get..........................

....

Deliver..........................

....

If there is any question or delay in regard to this errand, CALL Lexington 230 and find out what to do.

Signed..........................

Return this Slip to

Approved..........................

Exhibit 6.—Lexington Company. Messenger pick-up order.

vendor. This form of invoice, which was the same size as the purchase order, was used in order to standardize the records of the company in both form and content. When the invoices had been made out and returned by the vendor, the original was used for the accounting record and the duplicate for the files of the purchasing officer.

When the material to be purchased was something that was needed at once and that also could be picked up by a messenger sent from the Lexington Company, the form shown in Exhibit 6 was used, subject to the approval of the purchasing officer. The actual order was usually placed by telephone, and the purchase order was then sent with the messenger as a confirmation of the telephone order. The standard invoice form was sent to the vendor by mail. The messenger delivered the materials to the receiving department, where they were compared with the items listed on the order.

Gentlemen: Subject: Delivery of Material

Please refer to our order number which provides for the delivery of
on or before
required for immediate use in connection with an important manufacturing project, completion of which is being seriously delayed by this shortage.

While it is noted that delivery is not yet due, you will probably be able to make at least a partial shipment in advance of the due date. Accordingly the schedules involved have been arranged on the basis of receiving this material by

Kindly advise whether this date will be met.

Yours very truly,

THE LEXINGTON COMPANY

VBW:G Purchasing Officer

EXHIBIT 7.—Lexington Company. Request for early shipment.

Several form letters had been devised to facilitate asking for earlier deliveries than those specified on purchase orders, investigating late deliveries, and requesting invoices that had not been returned promptly. A supply of each of the letters was kept on hand, and a letter could be promptly sent out by filling in the name of the company, delivery date, order number, and type of material. Exhibit 7 shows a letter used to request an earlier shipment than had been stipulated at the time the order was placed. Exhibits 8, 9, and 10 are letters that were used when material deliveries had not been made on schedule. The letter shown in Exhibit 11 was used as a follow-up letter if no answer was received to the letters shown in Exhibits 8, 9, and 10. When the standard invoice forms sent out by the company were not received promptly, the letter shown in Exhibit 12 was used to request the immediate returns of the invoices.

Gentlemen: Subject: Delivery of Material

Delivery date of the to apply on our order number was

This material is urgently required for current projects, and it is necessary that delivery be effected at once.

Please advise when delivery may be expected.

Yours very truly,

THE LEXINGTON COMPANY

VBW:G Purchasing Officer

EXHIBIT 8.—Lexington Company. Form letter on partial deliveries past due.

Gentlemen: Subject: Delivery of Material

Our records indicate that the following material is due under our order number

Item No.	Quantity Due	Description of Material

Please advise when we may expect completion of delivery.

Yours very truly,

THE LEXINGTON COMPANY

VBW:G Purchasing Officer

EXHIBIT 9.—Lexington Company. Form letter on partial deliveries past due.

Materials shipped by the vendor were sometimes delayed in transit. In order that the traffic department might trace such a shipment and expedite its delivery, the form shown in Exhibit 13 was filled out by the purchasing department and sent to the traffic department.

Upon the arrival of material the receiving clerk recorded the quantity and condition of the shipment, filling out in duplicate a receiving sheet, such as is shown in Exhibit 14. After checking this record against his copy of the purchase order, the receiving clerk forwarded the original to the accounting department and retained the duplicate, designated by a large number 2 at the left.

Gentlemen: Subject: Delivery of Material

Delivery date of the to apply on order number
was

We have nothing to indicate that this material has been shipped, and in view of the fact that delivery is overdue, you are requested to give this order your immediate attention and to let us know when we may expect to receive the material.

Yours very truly,

THE LEXINGTON COMPANY

VBW:G Purchasing Officer

EXHIBIT 10.—Lexington Company. Form letter on overdue material.

Gentlemen: Subject: Delivery of Material

Please refer to our letter dated concerning delivery of
due under our order number

The shortage of this material is seriously interfering with important work and intelligent revision of our factory working schedule.

The courtesy of a prompt reply, giving cause of delay and probable delivery date, will be appreciated.

Yours very truly,

THE LEXINGTON COMPANY

VBW:G Purchasing Officer

EXHIBIT 11.—Lexington Company. Follow-up on overdue material.

Gentlemen: Subject: Invoice for Material

Please send us without further delay invoice for
supplied on order of

This invoice is now long overdue and to properly complete our records we must have it without further delay.

Yours very truly,

THE LEXINGTON COMPANY

VBW:G Purchasing Officer

EXHIBIT 12.—Lexington Company. Request for overdue invoices.

The accounting department clipped together its copies of the purchase order, invoice, and receiving record and sent them to the purchasing officer for approval. After having been approved, they were returned to the accounting office and filed under the discount date. When the discount date arrived, a check was sent to the vendor, the date of payment was entered on the invoice, and the records were filled under completed purchases.

THE LEXINGTON COMPANY

Date..........................

TRAFFIC DEPARTMENT

The following material shipped..
from.................................. by..............................
is still undelivered. Please trace and hurry delivery.

....
....
....

Car No....................
Waybill No................
Routing...................
Other Information...
....
....
....
....

....
PURCHASING DEPARTMENT.

Exhibit 13.—Lexington Company. Shipment tracer.

If material had to be returned to the vendor because of damage, wrong quality, or other reasons, a return shipping order, shown in Exhibit 15, was sent by the purchasing officer to the shipping department. This form gave all necessary instructions for shipping the material back to the vendor. At the same time, the purchasing department sent a standard credit invoice, shown in Exhibit 16, to the vendor to be made out in duplicate. When this had been filled out and returned to the accounting department of the company, the original was retained by the accounting department and the duplicate sent to the purchasing department to be filed.

The purchasing department kept a loose-leaf record of all purchases. For each article and kind of material purchased

THE LEXINGTON COMPANY
LEXINGTON, MASS.

RECEIVING SHEET
B 3327

Date..............................19......

Shipper..............................
Freight Car No...............*Express*...............*Charges*...............
Purchase Order No. *Pro.*

....
...............Boxes
...............Bags
...............Crates
...............Barrels
...............Kegs

Quantity	Size	Description	Net Wt.	
				Disposition..................
				Inv. Dated..................
				Department Signature..........

Condition.............................. *Received by*..............................
Remarks..............................

EXHIBIT 14.—Lexington Company. Receiving sheet.

by the company, the department kept a sheet on which it recorded the purchases of that item. This sheet, shown in Exhibit 17, contained 12 numbered spaces at the top in which to record the sources of supply for the article or material recorded on that sheet; below these spaces were columns for information on materials ordered and materials received. The "from" column in each case provided a space for the number of the supplier, corresponding to the number of the space in which the name of the supplier was recorded at the top of the sheet. At the bottom of the sheet, spaces were provided to designate the use of the article or material, the specification that governed the purchase, and the name of the article or material for which the record was kept.

THE LEXINGTON COMPANY
SHIPPING ORDER

SHIP TO 193

VIA

QUANTITY	DESCRIPTION
	BY

SHIPPED____________________ DATE____________________

EXHIBIT 15.—Lexington Company. Return shipping order.

THE LEXINGTON COMPANY
LEXINGTON, MASS.

ORDER NO.________
REQ. NO.________
TERMS { NET________
TERMS { CASH DISC.________

________193

CREDIT FROM________

QUANTITY	DESCRIPTION	LIST	NET	TOTAL
	CREDIT			

REC. SLIP NO.________
DATE________

PRICE O. K.	EXTENSIONS CORRECT	APPROVED	DEDUCTIONS	DATE PAID	PURCHASING RECORD	INVENTORY RECORD

EXHIBIT 16.—Lexington Company. Standard duplicate credit invoice.

THE LEXINGTON CO.—LEXINGTON, MASS.
PURCHASE RECORD

1	The A.B.C. Supply Co., Boston, Mass.	5		9	
2		6		10	
3		7		11	
4		8		12	

MATERIAL ORDERED				MATERIAL RECEIVED											REMARKS
From	Date	Order No.	Quantity	From	Date	Order No.	Quantity	Price	Per	Trade Discount	Cash Disc.	Frt. & Express	Amount of Invoice	F.O.B.	
1				1											

	For What Purpose Used	Specifications	Article

EXHIBIT 17.—Lexington Company. Purchase record.

13. GOLIATH OIL COMPANY

PURCHASING PROCEDURE

In May, 1931, an unsuccessful bidder requested the purchasing director of the Goliath Oil Company to cancel a contract placed with a competitor on the ground that he had been given a verbal promise of the order by a shipping clerk in the subsidiary of the Goliath Oil Company requisitioning the equipment.

The Goliath Oil Company, with offices in San Francisco, California, was one of the largest and best-managed oil companies in the United States. The company was a completely integrated unit in the oil industry and, through subsidiary companies, owned oil wells, pipe lines, refineries, distribution systems, and export companies. Notwithstanding the fact that many of the subsidiaries were large enough in their own right to form sizable businesses and in turn to control subsidiaries, major policies and coordination of management were controlled from the main offices of the Goliath Oil Company.

Although the 75 subsidiary and affiliated companies of the Goliath Oil Company were supervised by the parent company, a majority of these companies had complete business organizations which enabled them to operate independently. Thus each of the subsidiary and affiliated companies had its own purchasing department. The purchasing department of the Goliath Oil Company was organized in such a way that it was prepared to buy for the subsidiary and affiliated companies whenever those companies believed that the purchasing department of the parent company could buy to the best advantage. For this service the subsidiary and affiliated companies were charged a commission of approximately 1½%, varying somewhat according to the annual volume of purchases.

According to the procedure set up by the purchasing department, a uniform requisition form was used by all departments which required materials, supplies, and equipment in their operation. When the requisitions were received at the purchasing department, they were inspected by the purchasing director, who then allocated them to an assistant buyer. If current prices were at hand, or when quotations had been received, the buyer was prepared to place orders. In all purchases involving the expenditure of over $500, the purchasing director had to be consulted before an order was placed. It was a primary requirement of purchasing procedure that all orders placed by the Goliath Oil Company had to be authorized by the purchasing department.

In December, 1930, the purchasing department was notified by the Goliath Export Company, one of the subsidiary companies which distributed oils and gasolines in foreign countries, that within the next few months 500 gasoline pumps would be required for export. Requests for quotations were sent out to the Towser Pump Company, the Lane Tank and Pump Company, and the Measure-Rite Pump Company, three of the largest manufacturers of pumps in the United States. Each of the three companies submitted a price of $35 f.a.s. per pump. The Goliath Oil Company had in the past purchased from each of these three companies which were familiar with the purchasing policies and procedures of the Goliath Oil Company.

The purchasing department received no further requisitions or information from the Goliath Export Company regarding the pumps until May, 1931, when a requisition was received requesting the purchase of 500 Lane gasoline pumps. The buyer decided to request prices again from the Lane Tank and Pump Company, because of the steady decline in commodity prices since the quotations had been requested in December. The Lane Tank and Pump Company, however, submitted a price of $35 f.a.s. per pump.

The buyer believed that in view of the drop in commodity prices the $35 price was not justified; he decided, therefore, to request prices from the Towser Pump Company and the Measure-Rite Pump Company. A price of $28.50 f.a.s. per pump was submitted for Towser pumps, and a price of $28.75 f.a.s. per pump for Measure-Rite Pumps. The buyer consulted the executives of the Goliath Export Company as to whether either Towser or Measure-Rite pumps would be as acceptable as the Lane pumps. No objections were raised to the Towser and Measure-Rite pumps, and the buyer prepared to award the contract to the Towser Pump Company.

Before the order was placed, however, the salesman of the Lane Tank and Pump Company called on the buyer and requested the privilege of revising his prices, stating that a mistake had been made in submitting in May, 1931, the same price that had been quoted in December, 1930. The buyer took the matter to the purchasing director. After a discussion, the purchasing director decided that, since Lane pumps had been requested on the requisition, the Lane Tank and Pump Company's salesman would be permitted to submit another price. It was to be understood, however, that the Towser Pump Company would be allowed to submit new prices if it so desired.

When the revised bids were received, it was found that the Lane Tank and Pump Company had submitted a price of $28.50 f.a.s. per pump, and the Towser Pump Company had lowered its quotation to $28.25 f.a.s. per pump. The contract was awarded to the Towser Pump Company.

The day after the contract was awarded, the salesman from the Lane Tank and Pump Company and a correspondence clerk from the shipping department of the Goliath Export Company called on the purchasing director. In the course of the conversation it came to light that the clerk had made a verbal promise of an order for 500 pumps at $35 f.a.s. per pump to the salesman of the Lane Tank and Pump Company two weeks before the award of the contract to the Towser Pump Company. The salesman had forwarded an order to the factory immediately, and production had been started.

At first the salesman from the Lane Tank and Pump Company took the position that, since an employee of the Goliath Export Company had given him a verbal promise of an order and thus had implied a contract, the company was legally bound to carry out the contract and take delivery on the 500 pumps which were in the process of manufacture.

In accordance with the Goliath Oil Company's policy of treating suppliers fairly in all business relationships, the purchasing director gave thoughtful consideration to the argument of the salesman. After thinking the problem over, the purchasing director stated that he could find no justification for the salesman's arguments or actions. The salesman had called on the Goliath Oil Company and the Goliath Export Company for several years and knew, or should have known, that the correspondence clerk had no buying authority.

When the salesman found that his argument for a legal compulsion to accept the pumps was without avail, he pleaded for consideration on the basis that the loss of the order would cost him his position and that the depressed business conditions made it virtually impossible for him to obtain another position. He offered to meet the lowest price quoted by the Towser Pump Company.

14. LOCKPORT MACHINERY COMPANY

USE OF RECORDS AND REPORTS

In June, 1930, a new general purchasing officer was appointed by the president of the Lockport Machinery Company, manufacturer of heavy machinery, oil and gas engines, condensers, pumps, air compressors, and hydraulic turbines. After familiarizing himself with the operation of the purchasing department, the new general purchasing officer gave his attention to improving the purchasing methods, organization, and records. One of his problems was to decide what reports, records, charts, statistics, and files should be maintained. He believed that unless they served a definite purpose in the operation of the business there was no justification for the expense incurred in their compilation. He was convinced, furthermore, that it was a waste of both time and money to maintain charts and statistics which could readily be obtained from outside sources and services.

The Lockport Machinery Company manufactured its products in four plants located at Trenton, New Jersey; Worcester, Massachusetts; Cleveland, Ohio; and Buffalo, New York. Although each of the four plants had a purchasing officer who was allowed to buy certain items, the purchasing function of the company was centralized. The general purchasing department was located in New York City and was organized on a commodity group basis. One buyer purchased all pig iron, scrap, coal, alloy metals, oils, and lubricants. Another buyer bought all steel bars, forgings, shapes, tubes, and sheets. A third buyer purchased all electrical equipment and supplies, lumber, paints, bolts, and nuts. A fourth buyer purchased all printing and stationery. Annual purchases approximated $10,000,000.

In considering what reports and records his department should maintain, the general purchasing officer believed that there were two important factors to keep in mind: First, it had been customary to submit certain reports to other executives, and records had to be kept that would facilitate the compilation of these reports. Second, certain records and files were needed to facilitate the actual work of buying.

The company's purchase manual listed the reports which the general purchasing officer had been submitting to the other executives, as follows:

1. Daily	To the general manager in charge of engineering and manufacturing: List of requisitions received.
2. Monthly	To the president and to the general manager in charge of engineering and manufacturing: Report of all material commitments.
3. Monthly	To the general manager in charge of engineering and manufacturing: Report of extra savings made in the general purchasing department. (This report showed savings made by obtaining new materials or products to replace more expensive materials or products. A typical instance of such a saving occurred when one of the buyers found that cocks with a sandblast finish were just as satisfactory as machine-finished cocks and substantially cheaper.)
4. Monthly	To the general auditor: Report of scrap prices which were used as a basis for evaluation of scrap produced in the plants. These prices were taken from *Iron Age* and *American Metal Markets*.
5. Monthly	To the London Office: Report on the copper market.
6. Monthly	To the general sales department: Reports of orders placed amounting to $300 or over.
7. Yearly	To the comptroller: Prices for use in connection with the evaluation of the inventory.

The records needed to facilitate the actual buying were divided into three groups by the general purchasing officer. The first group included complete records of past negotiations, consisting of records of all materials purchased, including the names of the suppliers, the prices paid, and the company's experience as to dependability of shipments and quality of materials furnished; records showing sources of supply other than those used in the past; catalogue files classified and indexed so that materials could be located readily; and contract files, both active and discontinued. The second group included all records pertaining to market statistics and other information to be used in determining buying policies. The third group included records necessary properly to carry out reciprocal buying relationships.

The records and files which it had been customary to keep in the general purchasing department were as follows:

1. *Purchase Order Index.*—A list, classified according to materials, of all the purchase orders placed by the department.
2. *Purchase Record (Card File).*—A record showing the date, the quantity purchased, and the price paid for all materials purchased by the general purchasing department and the various plant purchasing departments.
3. *Materials Record.*—A yearly summary of the purchase record, showing the quantities purchased monthly and the average price paid.
4. *Price Record.*—A daily record of the market prices of all the materials commonly purchased by the company.
5. *Price Books.*—Records of market prices on various materials purchased. These were maintained for two buyers and the general purchasing officer, for the materials of special interest to these individuals.
6. *Stationery Order File.*—A file containing all stationery orders.
7. *Stationery Order Records.*—A record of the quantities and prices of stationery purchases.
8. *Catalogue File.*—The catalogues of vendors. These were listed both by name and by class of material and were numerically indexed.
9. *Catalogue File Index.*—A card index showing the name, material, and catalogue number of each vendor.
10. *Oil and Lubricant Purchases.*—A record of all purchases of oil and lubricants. This record was used for purposes of reciprocity.
11. *Chart Records.*—Charts showing price changes of various materials, inventories, and unfilled orders.
12. *Terms of Payment.*—A record showing the terms asked by vendors. The various plants and the accounting department were notified of all changes and additions.
13. *Contract Record.*—A record of all contracts and price agreements. The various plants and the accounting department were given complete reports covering this record and were notified promptly when any changes or additions were made.
14. *Contract Files.*—All contracts were filed in two cabinets, one for active contracts, the other for discontinued ones. On expiration dates, contracts were extended, replaced by new contracts, or discontinued.
15. *New York Order File.*—A file containing copies of all orders placed by the general purchasing department.
16. *Direct Order File.*—A file containing copies of all orders placed by the local purchasing officers at the various plants.
17. *Daily Papers and Trade Magazine File.*—A file containing all papers and trade magazines. These were kept for an indefinite period for price references. The price section of *Iron Age* was bound semiannually and filed for permanent record.
18. *Inquiry Lists.*—Lists showing names and addresses of vendors, according to classification of materials.

The company subscribed to Brookmire's service, the Whaley-Eaton Service, the United States Chamber of Commerce publications, and the principal trade publications concerned with the metal and machinery industry. The general purchasing officer's membership in the Purchasing Agents' Association of New York entitled him to receive the *Bulletin of the National Association of Purchasing Agents*, a pamphlet issued weekly, giving commodity statistics and summaries of the reports of the leading statistical services.

15. BONDVILLE MANUFACTURING COMPANY

REDUCTION IN NUMBER OF SMALL ORDERS

A reorganization of the Bondville Manufacturing Company was contemplated early in 1933. The management of the company was convinced that one reason for the series of losses sustained since 1929 was the inefficiency with which the purchasing function had been carried on. It therefore requested the purchasing officer, a man who had been with the company for nearly 15 years, to make whatever recommendations he felt were desirable in the performance of that function. That official began his analysis with a study of the problem of small orders.

The Bondville Manufacturing Company was engaged in the production and sale of electrical supplies and equipment. The company operated a single plant, located at Bondville, Pennsylvania. Of the total direct manufacturing cost, approximately 50% was attributable to materials and supplies. Stores were in charge of a storeskeeper who reported directly to the plant superintendent. Purchasing was largely decentralized, the purchasing function having been considered mainly a routine task.

Requisitions originated with the using departments and were filled by the stores department if the material was in stock. If the item was not in stock, the requisition was passed along by the storeskeeper to the purchasing officer, whose principal function consisted of placing orders. In most instances the order was placed with the vendor suggested by the using department on the requisition. This was the regularly authorized procedure which was usually followed, although at times the using department would place an order directly and subsequently secure the approval of the purchasing department.

The purchasing officer believed that the large number of comparatively small orders which he was called upon to place was a problem of outstanding importance. A cursory examination of his records revealed that, of approximately 10,000 orders emanating from his office in 1932, one-half were for $10 or less. Many of the requisitions reached him marked "Emergency Order—Rush." He was convinced that this proportion was excessive. The effect was not only to increase unduly the administrative work of his office but also to limit such selection as he was permitted among suppliers, since the sales departments of many companies either refused altogether to accept an order of less than a minimum amount or imposed a so-called "service charge." The result was that higher prices than the company otherwise would have had to pay were charged by those vendors from whom the Bondville Manufacturing Company did buy.

Although the purchasing officer had no data covering the cost of handling the orders which he himself placed, he was familiar with some more or less unrelated statements concerning the cost of small-order purchasing to sellers. One sales manager was responsible for the assertion that a $100 order cost his company $7 to handle, whereas a $20 order cost $5.30. Thus the cost of handling five $20 orders, totaling $100, was nearly four times that of handling one $100 order.

EXHIBIT 1

RATIO OF HANDLING COST* TO INVOICE VALUE

Range of invoice values	Average invoice value	Average handling cost (percentage of invoice value)
Under $1	$ 0.66	46.20%
$1–5	2.95	15.40
5–10	7.36	10.10
10–25	16.32	3.20
25–50	35.51	2.24
50–100	68.31	1.90
100–500	202.12	1.55
500–1,000	700.94	1.40
Over $1,000	2,252.49	0.94

* Handling excludes delivery, accounting, and collections.

Source: F. W. Nitardy, "Cost of Handling Orders," *Oil, Paint and Drug Reporter*, May 2, 1932, p. 21.

The head of another sales department had shown the purchasing officer of the Bondville Manufacturing Company the figures presented in Exhibit 1. According to these figures, the cost of handling an order with an invoice value of $1 or less was approximately 49 times as great per dollar of merchandise purchased as when the invoice value of the order was over $1,000. The compiler of the figures drew the following conclusion from them: On the assumption that a manufacturer should get 10% net profit over manufacturing costs, a minimum order must be over $10.

Attempts made by the purchasing officer of the Bondville Manufacturing Company to ascertain the purchasing costs of companies other than his own were not very successful. One such estimate was given as varying from 1% to 4% of the total invoice value of the purchases. A second was given as averaging ¾ of 1%. A third estimate was "from ½ of 1% to 1½%, or possibly a little higher." Each of these three estimates was an estimated average of all purchases made.

The purchasing officer also secured three estimates of the average cost per order for handling charges. The first estimate, which was from a tire manufacturer, was $2.50 per order, including an allowance for time and material. A second estimate was 97 cents per order. This figure was given by the purchasing officer of a machine tool manufacturing company. A third estimate was 86 cents per order.

At about the time the purchasing officer was engaged in making an analysis of this problem, he heard the matter discussed at the 1933 Convention of the National Association of Purchasing Agents. He learned that many companies either were or had been confronted by this same problem and were attempting to meet it in various ways. One effort that was being made was an attempt to combine related items into a consolidated order. Another plan had been worked out whereby all small orders and rush orders were assembled in the purchasing office at a given time daily or even twice a day. Still another was that of instituting a monthly requisition calendar which was designed in such a manner that when a requisition for any given item was presented, it automatically brought up for review other related items coming from the same source of supply.

16. HARRINGTON ELECTRIC COMPANY

INCREASE IN NUMBER OF SALESMEN'S CALLS

As a result of the major business depression which developed late in 1929, most industrial companies increased their efforts to obtain sales. One of the methods commonly used was to stimulate salesmen to increase the frequency of calls on prospective customers and to call on a greater number of prospective customers. The widespread adoption of such a policy by industrial companies had increased greatly the number of salesmen calling on the purchasing department of the Harrington Electric Company. This increase in the number of interviews with vendor salesmen almost completely monopolized the time of the purchasing director and his two buyers, with the result that their other duties were neglected and the efficiency of the purchasing department was impaired. In the spring of 1931 the purchasing director gave serious consideration to the advisability of either limiting vendor salesmen's calls or adopting some method of regulation which would permit him and his buyers to have more time for their other duties.

The Harrington Electric Company, located in Indianapolis, Indiana, was a long-established company. It manufactured various types of small electric motors and generators for use in automobiles, and other electrical devices, such as sockets, plugs, and switches. The company's products were of high quality and were sold to leading automobile manufacturers and to jobbers and wholesalers of automobile and electrical supplies. Annual sales were in excess of $10,000,000.

The purchasing department of the company was in charge of a purchasing director, who reported to the general manager. All materials, supplies, and equipment needed in the operation of the company's factory were procured by the purchasing department. The purchasing director bought all items of major value and importance, such as copper, coal, machinery, and insulation materials. One of the buyers bought all maintenance materials and shipping supplies. The other buyer purchased all chemicals, office supplies, stationery, and printed forms. In 1929 there were five clerks and stenographers in the purchasing department, who typed orders, maintained records, and performed routine duties. In the spring of 1931 there were only three clerks and stenographers, as two employees had left the company in the summer of 1930 and had not been replaced because of the necessity for economy in the operation of the company. Thus in 1931 the buyers and purchasing director had to give more time to clerical work than they had in the past.

Although the number of employees in the purchasing department had decreased, the amount of work performed by the purchasing department had actually increased. The unsettled commodity markets necessitated a great deal of study in order to buy intelligently, and the buyers had to spend more than the usual amount of time in studying business conditions and factors affecting the demand and supply of various commodities. Moreover, the research and engineering department of the company was continually attempting to improve the old products and develop new ones in order to stimulate demand for the company's products and to enable the company to meet competition with greater success. The purchasing department had to obtain new materials and develop new sources of supply to meet the demands of the research and engineering department.

Another condition which materially increased the amount of work performed by the purchasing department was the tendency of the company to manufacture each product in smaller lots, although in many instances such lots were manufactured at more frequent intervals than they had been in the past. Inventories of raw materials had been reduced to a minimum, and hence it was necessary for the purchasing department to place purchase orders at more frequent intervals.

In addition to all the factors arising within the company which tended to increase the amount of work performed by the personnel of the purchasing department, there were other factors which increased the pressure on the purchasing director and his buyers. The difficulty in maintaining sales volume had caused many companies to adopt policies which stressed reciprocal relationships. Demands for such relationships were frequently made on the purchasing department of the Harrington Electric Company, and time and effort were required to determine whether they were justified and to estimate the effects of a refusal to participate in reciprocal relationships.

Perhaps the factor which added the most to the work of the purchasing department was the great increase in the number of calls made by vendor salesmen. In an effort to maintain sales volume, the sales executives in many industrial companies had demanded more aggressive sales effort from their salesmen. The results of these demands had been to stimulate the salesmen to make more frequent calls in a given field and to extend the field. Some companies had even hired new salesmen in order to increase the sales pressure for the acceptance of their products.

For several years the clerk in the reception room of the purchasing department had kept a record of all callers. This record gave the name of the caller, the company he represented, the person in the department who was asked for, and the length of time of the interview. The purchasing director reviewed this record daily and thus was able to note promptly any increase in the number of callers.

EXHIBIT 1
HARRINGTON ELECTRIC COMPANY
Number of Salesmen Calling on the Purchasing Department

Month	Local callers			Out-of-town callers			Total callers per month			Total callers per day (average)		
	1929	1930	1931	1929	1930	1931	1929	1930	1931	1929	1930	1931
January	214	257	397	250	286	324	464	543	721	21	25	35
February	198	305	275	228	294	260	426	599	535	21	30	27
March	202	247	490	247	329	403	449	576	893	20	26	41
April	217	283	484	248	379	361	465	662	845	21	30	38
May	214	472		229	440		443	912		20	44	
June	254	490		276	400		530	890		24	41	
July	236	473		233	368		469	841		21	38	
August	262	231		240	178		502	409		23	20	
September	204	308		228	201		432	509		20	23	
October	271	392		295	348		566	740		26	34	
November	276	232		242	230		518	462		25	22	
December	232	260		199	203		431	463		20	21	
Total	2,780	3,950	1,646	2,915	3,656	1,348	5,695	7,606	2,994	22*	30*	35*

* Annual daily average.

In the latter part of April, 1931, the pressure of work resulting from the increased number of callers caused the purchasing director to consider whether it was possible to decrease the time required to interview these salesmen. He requested the clerk in the reception room to prepare statistics for 1929, 1930, and 1931, showing for each month in each of the three years the number of local and out-of-town callers, the total number of callers, and the average number of callers per day. The figures which were compiled (see Exhibit 1) confirmed his belief that there had been a great increase in the number of callers. Figures for April, 1931, were estimated on the basis of actual figures through the twentieth. Average daily calls were computed on the basis of a five-day week with holidays excepted. Computed as the difference between the hours of arrival and departure, according to the clerk's entries in the callers' record, interviews averaged 25 minutes each in 1929 and 37 minutes each from January 1 through May 1, 1931. The purchasing director ascribed the increase in the average time of the interviews to the fact that vendor salesmen were trying harder to secure orders and would not accept a refusal so readily as in more prosperous times. Further calculations revealed that in 1929, with a daily average of 22 callers requiring 25 minutes each, the total time spent in interviews approximated 9 hours and 10 minutes a day; while in 1931 a daily average of 35 callers requiring 37 minutes each totaled 21 hours and 35 minutes, an increase of 135%.

The purchasing director talked with other purchasing officers to determine whether they were having similar experiences. One purchasing director expressed himself as follows:

> During the last five or six years I have kept a record of the number of salesmen calling daily, and during the last three or four months I have noticed that there has been an increase of almost 100% of salesmen calling at this office over and above those who called during 1928 and 1929. This indicates one of two things: either the companies who are employing these salesmen are pushing them to call on every concern possible, or the salesmen themselves are not getting the business from their regular customers upon whom they depend and are working much harder than they have heretofore.

Another purchasing director made the following observation:

> In these days of constant striving for methods which will conserve time and reduce the cost of commodities, it seems to me the cost of time spent in interviews with salesmen might be given consideration, in the interests of the salesman's employer, as well as of the company employing the purchasing director.
>
> In my own case, I receive routine calls each week from salesmen representing 15 jobbers handling mill supplies; from printing houses there are an average of 10; stationery and office supplies, 5; and at greater intervals there are 5 oil salesmen, 15 coal men, 8 tool steel men, and so on, all down the line. Taking the mill supply and printing men alone, and allowing 3 minutes a call, it means that 1¼ hours per week, over 60 hours per year, nearly 1½ weeks every year are devoted to these interviews, and really I cannot point to any material saving or information of any particular value which I have received from these interviews

to compensate for the time spent, although I try to be, and I hope I am, sufficiently receptive to benefit from any valuable information when it is offered. Bulking all routine interviews together, I firmly believe that at least 1 month out of every 12 is spent in merely "passing the time of day" with salesmen across my desk, without any material benefit accruing to them or to me.

In the past the purchasing director of the Harrington Electric Company had adhered to the following policy expressed as one of the standards for buying and selling sponsored by the National Association of Purchasing Agents:

> To be courteous and considerate to those with whom we deal, to be prompt and businesslike in our appointments, and to carry on negotiations with all reasonable expedition so as to avoid trespassing on the rights of others to the time of buyers and salesmen.

As each caller entered the reception room, he was greeted by the reception clerk, who promptly notified the individual the caller requested to see. If that individual could not see the caller immediately, the caller was told the approximate time which he would have to wait. If the person requested by the caller expected to be busy for a considerable period of time, the caller was asked to step to the office door so that he could be greeted by the person he wanted to see and thus be assured that the individual was busy.

In determining a method by which to meet the problem presented by the increased number of callers, the purchasing director considered two possible courses of action. One was to refuse interviews to salesmen who at the time of calling seemed to offer nothing of immediate interest. The other was to cut down the average length of interviews so as to accommodate the larger number of callers without increasing the total time required for interviews.

If a policy of refusing to grant interviews were followed, there was likely to be a definite loss of goodwill, and future relations with certain suppliers might be jeopardized. A more serious consequence, however, would be the possibility that the buyers would miss valuable opportunities. The salesmen might have had new products to present which would aid the company in the development of its products; or the salesmen might have given some information of what the company's competitors were doing.

By cutting down the time allowed for an interview, it would be possible to see the increased number of callers in the same total time required under normal conditions. The limited interview, however, would require that in many instances proposals of merit be cursorily presented, and the result would not be satisfactory either to the salesman or to the buyer.

Modified forms of the two major courses of action also were considered by the purchasing director. One of these modified forms was to classify the products which the company used into three groups as follows:

1. Those products which were purchased often enough to warrant a weekly or fortnightly call by a vendor salesman.
2. Those products which were purchased at less frequent intervals and would warrant only a monthly or bimonthly call by a salesman.
3. Those products which were purchased or contracted for at rather long intervals of time and would warrant only a quarterly or semi-annual call by a salesman.

Vendor salesmen who called on the purchasing department would be classified under the three product groupings, and if they were calling too often they would be requested to observe the time lapse covering the product which they sold.

A method of regulating the number of callers which had been suggested by a marketing counselor was to give each salesman who called on the purchasing department a card similar to a meal ticket, which was good for a certain number of calls during the year. The salesman possessing such a card would be able to call on the purchasing department at any time as long as he had unused calls left on his card. After he had used his quota, however, he would have to wait for further calls until the next year, when he obtained a new card. The number of calls allotted in the first place would be determined by what the purchasing director thought was desirable and necessary in order to carry on satisfactory relationships with the suppliers.

A method to which the purchasing director had given serious thought on several occasions was to establish certain hours on designated days for the interviewing of local vendor salesmen. The purchasing director realized, however, that this plan could not be applied to those coming from out of town because such salesmen would often be inconvenienced thereby and would either lose valuable time in waiting for an interview or go to another city without calling on the company. In the first instance, there would be a definite increase in selling expense for the vendor which might be reflected in the quotation of higher prices to the Harrington Electric Company. In the second instance, the company might be the loser by not having heard the salesman's offer, which might have had definite advantages for the company.

The purchasing director believed that any method developed to cope with the problem would not be successful unless it provided for the following conditions:

1. Flexibility in dealing with various types of salesmen, representing various types of suppliers. No one system could be used as a substitute for judgment on the part of a buyer.
2. Equality in the treatment of all callers. This was essential if the purchasing department was to maintain the goodwill of suppliers which had been built up over the past years.
3. Simplicity in operation, as no system or method which required an elaborate routine or much clerical labor would be desirable.

The purchasing director believed that the ideal for which to strive was to give a courteous reception to every salesman with materials or service that could be used by the Harrington Electric Company and to allow him sufficient time to present his proposal. He believed, however, that if that privilege was abused, either deliberately or through lack of knowledge of his company's requirements, some steps should be taken to avoid the waste of time both of the buyers and of the salesmen.

SECTION III

QUALITY CONTROL

17. COLWYN AUTOMATIC MACHINE COMPANY

CONTROLLING THE PURCHASE OF TECHNICAL MATERIALS AND PARTS

The Colwyn Automatic Machine Company manufactured machinery for packaging and wrapping all types of products. Early in 1938 the purchasing officer of the company, believing that a better control over purchases was desirable, suggested to the management that a "stock standards committee" be set up to review all engineering specifications requiring the purchase of special materials and parts.

Although over 85 machines were included in its line, the Colwyn Automatic Machine Company was seldom able to sell equipment without redesigning a stock machine to fit a customer's individual requirements. The continued success of the Colwyn company was dependent, therefore, upon the engineering department's ability to design equipment which not only would perform the desired function satisfactorily, but also could be obtained by the buyer at a price equal to or lower than the prices quoted by competitors.

Most of the Colwyn company's design activity was under the supervision of its 10 most experienced engineers, each of whom was in charge of the complete design of certain types of machines. Within his particular field each engineer was responsible for the design of all parts making up a complete machine. To a great extent these experienced engineers, most of whom had been with the company many years, functioned individually and almost independently of each other. Each had his own ideas as to the design of machines and as to the parts and materials to be used in manufacturing them. The 30 other engineers in the department worked under the supervision of the more experienced men.

With the exception of castings, which were bought by the castings buyer,[1] all parts, materials, and supplies were purchased by the purchasing officer. The castings buyer reported to the purchasing officer, but largely functioned independently of the purchasing department routine. A different purchase order was used for the purchase of castings, and the records of the castings buyer were kept separate from the rest of those in the purchasing department. Because high quality was essential to the Colwyn company's manufacturing operations, the company usually procured castings from only three or four foundries which it designated as its regular sources of supply. From experience the castings buyer had learned which of these foundries was particularly qualified as a source of supply for each type of casting. His principal task, therefore, was to determine from blueprints which of the designated foundries was best fitted to make a certain casting. Such decisions were largely a routine matter, as the number of suppliers was limited.

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[1] See Case 4, Rexburg Machinery Company, p. 23.

All purchases, other than castings, were made by the purchasing officer in response to requisitions issued by the chief clerk of either the main stock room or the steel stock room. Requisitions were issued when the parts or materials which the Colwyn company carried in stock reached predetermined minimums. Requisitions for parts and materials which the Colwyn company did not carry in stock, and for which there were, therefore, no reorder points, likewise originated with one of these chief clerks. Such requisitions indicated the exact quantity required by the factory for a particular production order. When requisitioning parts and materials which the company did not carry in stock, the chief stock clerks were dependent on engineering specifications and blueprints furnished by the engineering department. These parts and materials might be standard to the line of some supplier or might be special because of their nonstandard size, shape, or some other characteristic of unusual design.

In 1937 a young engineer who had been working for the Colwyn company for about six years, both in the factory and as a salesman, was appointed purchasing officer to succeed a man who was transferred to another position. The new man was appointed because of both the excellence of his technical training and his factory and sales experience.

A problem which came almost immediately to the attention of the new purchasing officer was the question of buying special materials and parts. He soon became convinced that the engineering staff was giving insufficient attention to eliminating as far as possible the use of all materials and parts which either were not carried in stock by the Colwyn company or were not standard to the line of some supplier. Although he examined all requisitions before issuing purchase orders, the purchasing officer hesitated to delay a purchase long enough to investigate the necessity of buying the special parts or materials. He had not kept a list of such requisitions and did not know exactly the number and value of special parts and materials purchased each year. He was convinced, however, that the cost of such items was substantial and that a reduction in the amount was desirable. He felt certain that greater care on the part of the engineers would result in eliminating many of the odd items. For example, the engineering staff had specified for a certain machine a heater unit that was ½ inch shorter than an otherwise identical heater which the company had in stock. The price for the special heater was $7, whereas the company regularly purchased the stock size for $4.50 a unit.

As a first step toward reducing the number of special or nonstock items requisitioned by the engineering staff, the purchasing officer prevailed upon the executive vice president to authorize the employment of such additional clerical assistance as would be required to draw up a stock catalogue. In this catalogue were to be listed all the items which the company carried in stock or which, though not stocked, were frequently specified by the engineering staff. No parts or materials were to be included, however, unless they could be found in the catalogues of some dependable supplier. In the purchasing officer's opinion, such a catalogue not only would constitute a convenient source of information concerning the items which were readily obtainable, but also would lead to executive discussions of special item purchases, in terms of the adequacy with which the items given in the catalogue would cover the company's normal requirements.

In July, 1938, the purchasing officer hired two additional stenographers for this work. Their employment was expected to be only temporary, as the purchasing officer believed the stock catalogue could be completed by December of that year.

As a basis for the stock catalogue the perpetual inventory cards and the records of the purchasing department were used. In order to establish standard methods of expressing specifications on blueprints, the first part of the catalogue presented (1) engineering instructions, and (2) data sheets. The engineering instructions consisted of such information as the proper scales to use in scale drawings, the means of indicating dimensions and tolerances, the lettering to be used, the methods of showing cross sections, the abbreviations for common terms, the method of indicating the type of finish, the dimensions of milling cuts, slots, and keyways; these instructions also showed sample drawings of a wide variety of types. The data sheets consisted of such information as a table of standard gauges. All this information was drawn up with the cooperation of the chief engineer.

The balance of the stock catalogue listed 700 different parts and materials carried in stock by the company and gave a detailed description of each. Under each item were given the standard sizes commonly used by the Colwyn company. For example, the catalogue listed 7 sizes of a certain make of single-row roller bearings, 20 sizes of one make of cog belt, 375 sizes of bronze bearings, and 265 sizes of a certain type of sleeve bearings. For each item such information was presented as the part number, the supplier's catalogue number, the dimensions, the source of supply, and the average price. In some instances, three or four brands of nearly identical parts were listed. The catalogue showed, for example, that the company had in stock and was specifying for its machines four makes of V-belt drives. An asterisk placed after the name of a part or material indicated that the item was not in stock but was readily obtainable from a supplier.

On the basis of information gained from this catalogue, the purchasing officer endeavored to eliminate, as far as possible, all purchases of parts and materials which could not readily be obtained from some supplier. He began to question those requisitions which, from his knowledge of parts and materials and his engineering experience, he believed were unnecessarily specifying nonstandard parts. After repeated efforts to get such requisitions changed, the purchasing officer came to the conclusion that in the face of the opposition of much of the engineering staff he alone could not induce the members of that staff to place greater emphasis on the use of standard parts and materials in machine design. He therefore proposed to the president and executive vice president that a stock standards committee be set up which would have authority to review all specifications calling for nonstandard parts and materials. He proposed that this committee exist for the purpose of "increasing the effectiveness and usefulness of our stock" by making the design engineers justify all specifications for parts and materials which could not be readily furnished from either the Colwyn company's own stock or the stock of some supplier.

This stock standards committee was to be composed of 13 members:

1. The executive vice president of the company, who was to be chairman. He was not primarily a production man by training but had unusual ability to keep discussions strictly within the confines of the point at issue.
2. The chief engineer, who was to be vice chairman. Because he was quiet and retiring, this official had not assumed the position in the company which his excellent knowledge of engineering and the company's problems justified. He functioned essentially as a consultant on design, and his advice was available to all the engineers employed by the company, but, although chief engineer, he had never enforced his authority over the engineering department.
3. The plant superintendent, who was in charge of the company's production activities.
4. The chief draftsman, who was head of the drafting department and, as such, was concerned with methods and standards of manufacturing.
5. The engineer who was in charge of all quotations to the company's customers.
6. The engineer who was in charge of the specifications of parts and materials given on blueprints and specification sheets.
7. The general foreman of the company's plant.
8. The chief clerk of the main stock room.
9. The purchasing officer, who was to act as secretary of the committee.
10. The engineer in charge of the standards department.
11. The head of the cost department.

12 and 13. A representative from the engineering staff of each of the company's two wholly owned subsidiaries.

In addition to suggesting the tentative membership of the stock standards committee, the purchasing officer prepared for the consideration of the president and the executive vice president a proposed "charter" for the committee. This charter had the following provisions:

1. The committee was to have authority over the chief clerks of the main stock room and the steel stock room. Included in this authority was the power to review the method of stocking parts and materials and the method of recording inventory information, as well

as the right to analyze all specifications to see that they adequately described the parts and materials.

2. The committee would be given sole power to authorize changes in the stock catalogue. Along with this authority went the responsibility for seeing that the information in the catalogue was both up to date and sufficiently adequate to make it unnecessary for an engineer to refer to any other source for such information as parts and materials specifications, prices, and suppliers.

3. The committee would have the power to enforce the rule that all engineering design must be limited to items in the stock catalogue and must conform to the engineering instructions given in the front of the catalogue. The engineer in charge of specifications was to have sole authority to grant exceptions to this rule.

4. Such exceptions must be reported by the engineer in charge of specifications to the purchasing officer, who, as secretary to the committee, must make a full report at the next meeting of the committee. In addition to making such reports, the purchasing officer was to prepare, with the aid of the chief engineer, the engineer in charge of specifications, and the chief clerk of the main stock room, agenda of the proposals and problems to be discussed at each meeting of the committee. The committee was to meet on the first Tuesday of each month, and special meetings might be called at the discretion of the chairman or, in his absence, of the vice chairman.

To the purchasing officer, his proposed stock standards committee had two advantages. First, it would make possible a free and open discussion of inventories, suppliers, parts specifications, and similar problems in a formal meeting attended by all the important officials concerned. Second, because each person would be expressing his opinion in a formal meeting, the purchasing officer would not be forced to bear alone the onus necessarily involved when the engineering staff was criticized. Also, since ideas would be expressed before a group, instead of between individuals, discussions, he believed, were less likely to evolve into personal differences of opinion, with "a corresponding reduction in the blood pressure of everyone."

On the other hand, the management of the Colwyn company recognized that free operation of the creative powers of the engineering staff was essential to the continued profitable existence of the company. If the engineers in their design activity were limited almost exclusively to those parts and materials given in the stock catalogue, it was conceivable that the effectiveness of their work might be impaired.

The proposed plan was adopted, however, and the first meeting of the stock standards committee was held on November 9, 1938. The purchasing officer as secretary made the following report on the decisions reached at that meeting:

1. Special heaters or other commercial items, or items of our own manufacture which have been procured for experiment or for a special use on a machine, which cannot be put to direct use on any particular job, shall be put into "salvage stock."

2. All salvage stock is to be kept in a special location in the main stock room, and there is to be a sheet in the stock catalogue showing the amounts of this material which are on hand.

3. Salvage stock is to be weeded out periodically at the discretion of the chief engineer and the foreman of the main stock room. The foreman of the main stock room will notify the engineer in charge of specifications each time an item is taken from salvage stock, so that the necessary corrections can be made on the salvage stock sheet in the stock catalogue.

4. The foreman of the main stock room is empowered to junk all material carried in drafting room stock which has lain unused for a period of two years or more. There may be exceptional cases where in the opinion of the drafting room an item should have time extended beyond this rule. The foreman of the main stock room, however, should submit a list of the material that was junked to the committee.

5. The American Standards Association coarse thread series and fine thread series shall be adopted as standard for all threaded items that we purchase outside or manufacture ourselves. Lack of taps and dies to produce the standard threads shall not be held as a reason for an exception to this rule, and we shall purchase whatever tap and die equipment is necessary to manufacture in accordance with these standards.

6. Sizes No. 12 and No. 14 machine screws are to be dropped from stock and shall not be used in further designs, and wherever possible old drawings will be changed to eliminate their use.

7. Brand A oilers shall be standard for all future use. Brands C, D, and E shall be superseded entirely by Brand A, and we shall get rid of our stock of these as quickly as possible. New charts shall be developed showing Brand A oilers corresponding to those superseded for use by the main stock room, the engineering department, and others interested. The new charts will enable these departments to use the standard oiler to fill the requirements given on old drawings.

18. TOBTON COMPANY

RELATION OF PURCHASING DEPARTMENT TO PRODUCTION AND ENGINEERING DEPARTMENTS

The Tobton Company manufactured special electrical instruments and parts for making experimental and testing apparatus. The products of the company were exceedingly technical, and its engineers were constantly redesigning old products or developing new ones. On the grounds that most of the raw materials and parts purchased by the Tobton Company not only were technical but also were often designed to fit the special requirements of a particular piece of apparatus, such purchasing problems as what to buy and where to buy were to a large extent settled by the company's engineering staff. Purchase orders and invoices were handled, however, by the purchasing department. Late in 1938 the comptroller of the company was considering the operation of the purchasing department, in its relation to the production and engineering departments, with a view to improving the company's purchasing methods.

The Tobton Company manufactured devices and instruments for measuring and analyzing electrical energy. Most of its products were accessory equipment and were not controlling factors in its customers' manufacturing costs. In many instances it was the sole manufacturer in the field designing and manufacturing such equipment; in the case of a great majority of its products, the Tobton Company was the only source of supply which could ship such equipment from stock. In 1937 the company's sales volume was $1,340,000.

The market for the company's products included all manufacturers of electrical equipment as well as power plants, electrical research organizations, radiobroadcasting companies, government technical bureaus, and educational institutions; the actual user was usually an engineer or scientist within such an organization. Sales were made from the company's catalogues. Prices of the company's products ranged from less than $1 for small experimental parts to well over $1,000 for complete instrument assemblies. In general, technical performance and specifications were more important to the customer than price. In a few instances, the Tobton Company had been approached by customers who desired some special type of product not included in the Tobton Company's catalogue and who were ready to pay almost any price to get it. The Tobton Company usually discouraged such requests and attempted to persuade the customer to use equipment which the Tobton Company listed in its catalogue and carried in stock. Although a few special items were made to customer specification and minor modifications were regularly made, about 95% of the company's total business, excluding government contracts, consisted of sales from stock.

In 1937 the company's catalogue contained from 800 to 900 items. Numerous small parts remained the same year after year and were made in fairly large quantities. In so far as representative instruments were concerned, however, only 50 to 200 units of each model were sold during the two-year period which was its normal expected life. Usually, after about two or three years either a model was redesigned or replaced by a new product, or, because the model had become standard to the industry and could be made by numerous concerns, it ceased to interest the company, which then dropped it from the line. Each month the company announced one or more additions to or changes in its catalogue. In 1936, investigation by the comptroller showed that 50% of total shipments during the previous year represented models that had been developed and introduced within the three calendar years 1933, 1934, and 1935.

The engineering staff which did this development work consisted of graduates of technical and engineering schools, the value of whose services to the company was largely dependent on their ingenuity in the original development of various new circuits and types of equipment. As a rule, the men chosen had master's or doctor's degrees in some highly specialized field of science or engineering. One or two new men were added to the engineering staff each year for either development or sales promotion work; both these functions were performed by the engineering department. The expense of maintaining its research and development department cost the company from 7% to 10% of total manufacturing cost. On sales of instruments alone, exclusive of replacement parts or parts purchased solely for resale, this engineering expense was 15% to 20% of total manufacturing cost.

The entire program of engineering development was supervised by the design committee which performed the active operating function of a chief engineer. This committee was composed of the president, who was largely interested in research and product development; a scientist in the employ of the company, who was primarily interested in the field of physics; two engineers, who were chiefly concerned with sales problems; and one of the company's leading development engineers. The design committee discussed the problems to be solved, and after defining these problems the committee issued instructions and specifications to the engineers whom it selected to do the job.

These engineers had available the results of all previous research which had been done by the company and also had the resources of the extensive engineering laboratory which the company maintained. The engineers received parts samples which might possibly aid them, and they usually interviewed engineers from suppliers of the types of materials and parts in which they were interested. In many instances the Tobton Company's engineers were dependent to a great extent upon a supplier's engineer for technical information.

When the engineers had developed an experimental model which in their opinion fulfilled the specifications of the design committee, they referred this model to the design committee for its approval. The committee analyzed the new product from the standpoint of the essential soundness of the design, its salability, and its probable production cost. If the model was found to be unsatisfactory in any respect, changes were recommended. In some instances, the committee requested almost a complete redesign.

After the experimental model had been approved by the design committee, it was referred to the drafting department. Each part which made up the complete unit was analyzed to determine size, material, weight, and mechanical strength. A definite effort was made to use parts or materials which the company carried in stock, or which were readily available and standard to the industry. The drafting department referred all proposed changes of parts and materials to the development engineer to be certain that such changes would not alter the circuit or electrical performance. The drafting department then drew blueprints from the experimental model to show the arrangement of parts and diagrams of circuits and made a complete list of all parts and materials in the model.

The work of the drafting department essentially was translating the parts and materials used in the experimental model into blueprints and parts lists. When an engineer had decided to use parts that already bore a part number of the Tobton Company, the problem was simplified. If he had considered it essential to use parts that had not been utilized in previous assemblies, it was necessary for him to draw up and give to the drafting department specifications which indicated precisely the characteristics desired. These specifications might be based on information from a variety of sources. The most obvious source of information was the company's files of catalogues from a wide variety of suppliers. As a rule the engineers used their own catalogue file which was maintained as a part of the technical library. Further information was usually requested in correspondence between the Tobton Company's engineer and members of the supplier's technical staff. Another source for this type of information was furnished by the sales engineers who were constantly calling at the Tobton Company's offices. Unless answering a specific inquiry from a Tobton engineer, these salesmen were interviewed at their first call by the purchasing officer, and he referred them to the engineer who he believed would be most interested in their type of product. From these salesmen the design and development engineers of the Tobton Company learned of recent product developments of its suppliers and discussed ways of solving particular problems of design or circuits. As a rule, the engineers made arrangements directly with these salesmen in regard to purchasing parts which were to be used for the first time by the Tobton Company in the equipment which they were designing. Some of the parts which were thus discussed by the engineers and visiting salesmen were standard, or required only relatively small changes to adapt them for use by the Tobton Company. At times, however, new products had to be designed and developed with the cooperation of engineers of both the Tobton Company and the individual supplier.

The visits to suppliers' plants made several times a year by the Tobton Company's engineers constituted another fruitful source of information on which specifications might be based. The plant superintendent and purchasing officer of the Tobton Company also visited the plants of suppliers. Such visits were chiefly for the purpose of investigating a supplier's ability to produce parts in accordance with the rigid specifications of the Tobton Company. In addition, however, the engineers picked up much miscellaneous information concerning uses of various types of materials and products, and lines of research that were currently being followed by the research departments of the suppliers.

For each item on the parts list, the name of the part, the company from which it was available, and the catalogue number, if any, were recorded in the column headed "Name of Part." If more detail was necessary, or if no catalogue description was available, there was included the number of the drawing which had been made of the part. These drawings or blueprints presented in detail the shape, size, and characteristics of the product under discussion.

Once the parts list had been made up, the new product was ready to be considered by the production department. In the first place, the parts list was checked with stock records in the production office to see which parts would have to be purchased or manufactured. Requirements for raw materials and parts usually were estimated at this time only on the basis of an exceedingly small experimental lot, normally not over 10 units. If certain of the parts had to be purchased, it was the company's policy to buy only enough for this lot, even though such small purchase orders would probably mean somewhat higher prices than the company would pay in producing a lot of the normal size of from 50 to 100.

For parts that were not standard, however, the company was faced with the problem of determining the size of its order. In the case of such parts, which were not included in the catalogue of any supplier, the Tobton Company would often have to pay an excessively high premium for buying in very small lots. Under such circumstances the development and design engineers had to weigh the probability that subsequent design change would be necessary after the experimental lot was produced. In other words, the danger that actual factory production would reveal the need for a change in parts specifications had to be balanced against the increased unit cost of buying in small lots.

After deciding the size of order for those parts which had to be purchased, the production department sent to the purchasing department requisitions for the parts needed for the experimental lot. These requisitions gave the quantity required, detailed specifications, the date on which the part was needed, and, as a rule, the price which was to be paid. Generally the name of the supplier was a basic part of the specifications, since it was the engineers' belief that similar products of two manufacturers were seldom identical, and that, if the instrument operated correctly, it was dangerous to shift from one supplier of a part to another.

Upon receipt of these requisitions the purchasing department made out the purchase orders and arranged for shipment at the time specified on the purchase requisitions. Both the purchase requisitions and the purchase orders were kept on file by the purchasing department as a permanent record.

As soon as the design of the new product had been settled, following the experimental run of the model, the factory superintendent and the engineer in charge of the sales of the item then decided on the desirable lot size for production. The basic consideration in all cases was the estimated volume of sales. Instrument lot sizes varied from 25 to 100 units; a minimum of 50 units per lot was typical. After the quantity to be made was determined, a production order was made out which was accompanied by all pertinent parts lists, blueprints, and specification sheets. This production order was first compared with the stock records to determine which parts and materials must be purchased. As a rule, such raw materials as insulated wire, steel shafting, brass, nickel, silver, bronze, aluminum sheet, and bakelite tubing, sheets, and rods were available in stock. The company carried these items in commercial sizes and purchased them in quantity lots in order to get low prices. The company rarely required sizes and types of these items that it did not have in stock.

In addition to raw materials, the parts needed in filling a production order usually fell into one or more of four categories. In the first category were "stock" parts that the company kept in its own inventory. Each of these items, as explained above, bore the part number of the equipment in which it had first been used. Such stock items were reordered when inventory reached an indicated minimum. At such times the purchase requisition was made out by the stock clerk with the approval of the factory superintendent. In matters of unusual importance the approval of the vice president in charge of manufacturing was also requested. Upon receipt of such a requisition, the purchasing officer usually duplicated the specifications given on a previous purchase order for this material and ordered it from the same supplier. If the supplier was unable to meet the price or product specifications, however, the purchasing officer referred the problem back to the factory superintendent or the vice president. For example, the Tobton Company had for years been buying a certain type of battery from one supplier. Late in 1937, upon reordering these batteries, the purchasing officer was informed by the supplier that the over-all size of the batteries had been changed. There was, however, no change in the performance specifications of the battery. Because of this change in size, it was necessary for the factory superintendent to change the specifications for all battery clamps.

The second type of item consisted of parts which were standard products of one or more suppliers and had been used previously by the Tobton Company, but which were not carried in its inventory. These items bore the Tobton Company part number if they could not be identified by a supplier's part number. As in the case of the first type of item, the purchasing officer referred to a previous purchase order when he received a purchase requisition for the items.

The third type differed from the others in that although the items were standard to one or more suppliers, they were being used for the first time by the Tobton Company. In these cases, the purchasing officer had no previous purchase order to refer to and was therefore forced to rely on blueprints and detailed specifications or on the supplier's catalogue number. Normally, however, a source of supply was given, and his task usually consisted of arranging for prompt shipment and attempting to secure the best price possible.

The fourth type consisted of special items which were not standard to any supplier and which must, therefore, be made by some manufacturer for the Tobton Company. These items ranged from slight modifications of a supplier's standard products to products completely designed by the Tobton Company. Some of these might be made in the company's plant or purchased from outside sources, depending on the percentage of capacity at which the company's plant was operating. When these products were entirely special and were manufactured in accordance with Tobton specifications or designs, the outside supplier was given blueprints and all other pertinent information. The original purchase of these nonstandard items was usually arranged in interviews between a supplier's salesman and an engineer of the Tobton Company. The purchase requisition, therefore, although as usual it emanated from the production office, contained a summary of the arrangements which the company's engineer had made with the supplier and all technical information necessary for manufacture.

In determining the quantities to be purchased, the company was always concerned with having on hand the number of parts necessary to produce the models that were currently going into production. If the part was not usually carried in stock, generally only an amount sufficient to take care of current requirements was bought. If a part was stocked, the company then considered, in addition to the number necessary to produce the current model, the number of other types of assemblies in which the part was used. This information was taken from cross-reference files. The part also was analyzed from the standpoint of prospective design changes. The superintendent was sufficiently in contact with the work of the development engineers and the design committee so that as a rule he could give a reasonably accurate opinion as to the probable duration of the existing requirements for an item. A final and important basis for determining the size of purchases was the number of assemblies in which the part was used which were in the hands of customers. It was essential that the company at all times have on hand enough repair parts for assemblies to make prompt shipment to customers, since the failure of one small part would often throw an entire mass of equipment out of operation. It was not unusual for instruments to stay in a customer's service for a number of years after they were discontinued from the catalogue of the Tobton Company. In such instances customers still expected to purchase replacement parts from the Tobton Company.

The purchasing officer of the Tobton Company tended to follow precisely the specifications, quantities and suppliers indicated on a purchase requisition. There was, however, no rule preventing him from suggesting different suppliers and different materials if such changes would result in savings to the Tobton Company. Early in 1936, for example, the purchasing officer received a requisition to order another lot of a certain part which, for two years, the Tobton Company had been buying at a unit cost of 37 cents. Upon receiving the requisition, the purchasing officer found that, though the current supplier had been a reliable source up to that time, he was no longer able to furnish the desired part. These items were important since they were used in four instruments which at the time were being produced at the rate of between 50 to 60 units a month, although normally the rate was about 30 units a month. After reporting the situation to the development engineer who had specified the original use of these parts, the purchasing officer was instructed to find additional sources of supply. Using the specifications given with the original parts list, the purchasing officer was able to find a manufacturer who would produce, at 19 cents per unit, parts which he claimed were similar to those manufactured by the first supplier. This claim was substantiated by the development engineer after he had examined a sample submitted by the purchasing officer. The development engineer, in fact, stated that in certain particulars the less expensive part was superior to the more expensive unit.

The purchasing officer considered this incident an outstanding example of the way in which purchase savings might accrue to the company. He pointed out, however, that normally nearly 50% of the company's total annual purchases of $450,000 involved highly technical parts, the value of which was understood only by the engineer directly concerned with the design of the equipment in which they were to be used. He stated that unquestionably there were many instances in which the company was paying more than was absolutely necessary for certain of the products purchased. In most cases in which he had questioned price, specifications, or suppliers, however, he had found there was a definite reason for making the purchase exactly as indicated. He had found that because of technical differences two products supposedly identical were different in certain minute characteristics when used in precision instruments. In the case of one product, for example, when the production model was manufactured, it was impossible to obtain the same results that had been achieved with the experimental model. No explanation seemed possible until it was found that one of the parts used by the development engineer, a standard part of a well-known supplier, happened, through coincidence, to have certain particularly desirable characteristics which were not always present to the same degree in this mass production item, because they were not significant in the usual application of the item. In other words, the experimental instrument had been designed around a freak. After this discovery the supplier was asked to select parts differing in certain respects from otherwise standard parts. Later, it was considered advisable to shift the business to a smaller producer of similar parts who was more interested in catering to special requirements.

After examining the purchasing routine of the company the comptroller decided little change should be made. He believed the most important element of the company's products was the engineering development that had gone into them, although, in the case of most complete instruments, materials and engineering expense each represented about 20% of total manufacturing cost. In addition, all the company's products had to conform to very rigid specifications, and once a part had proved satisfactory, it was dangerous for the company to shift from one supplier to another, even though a saving might be made. The comptroller did not, however, endorse the attitude of the engineers who on more than one occasion had told a supplier's salesman that "the price is no object so long as your product's right." He appreciated that the purchasing officer of the Tobton Company was given less discretion than in most manufacturing companies, "where the number and variety of technical purchases are less, and changes do not come too rapidly for one man to become thoroughly conversant with the factors governing the purchase of each item."

The purchasing officer, who was not an engineer, had been with the company over 20 years, and the company did not propose retiring him until he so desired. The comptroller believed, however, that the next purchasing officer of the company should have engineering training. Such training would help the purchasing officer to appreciate the technical side of the company's business and to understand better the problems confronting the engineers. Also, a technically trained purchasing officer probably would be in closer cooperation with the engineering department and would, therefore, be in a better position to understand future requirements of the company in regard to new products and suppliers. He would be able more adequately to select from the samples submitted by several suppliers those items in which the company would be interested and would know quickly which of the engineers was most directly concerned. The comptroller believed, also, that with adequate technical training the purchasing officer could weigh more analytically the technical statements made by salesmen, and would have a more balanced approach to the problem of comparing different suppliers, their products, and their salesmen. Finally, if the purchasing officer was an engineer, he could take note of suggestions of new suppliers or new products which came before him and hold these suggestions until such time as they might be useful to the company, without being forced to consult an engineer who would probably not be interested at the time the subject was introduced.

The vice president in charge of manufacturing also had a criticism of a nontechnical purchasing officer. In the vice president's opinion the purchasing officer's lack of technical training made it impossible for him to catch errors in specifications given on purchase requisitions. The vice president stated that in a few instances parts had been purchased incorrectly, even though the errors were such as should have been caught with reasonable celerity by a technically trained official. He pointed out that, although a few such errors were bound to slip through, a technically trained purchasing official would be additional insurance against their occurrence.

Both men, however, appreciated that the purchasing officer was doing a good job in performing his part of the purchasing function. If an item remained for several years in the company's line, he was able occasionally to suggest changes in products purchased and in suppliers which resulted in savings to the Tobton Company. The purchasing officer prior to employment with this company had had practical shop training. At one time he had been assistant superintendent of the Tobton Company as well as purchasing officer, and was probably better acquainted with the company's machine tool and equipment needs than any executive other than the president.

19. SOURCE SELECTION ON BASIS OF SAMPLES[1]

In 1936 the National Association of Purchasing Agents, believing that a discussion of the various factors involved in the selection of a particular vendor as a source of supply would be desirable, invited its members to submit manuscripts devoted to a consideration of this topic.

The author of one of these manuscripts devoted a portion of his analysis to "receiving bids on samples submitted by vendors." The following material is taken partly from the original paper and partly from a subsequent elaboration of the theme by the author.

Somewhat greater leeway is obtained in selecting a source if the buyer has reserved the right to determine relative values from samples submitted. The proponents of standards specifications are inclined to deprecate the "or equal" stipulation so freely used, but if the "or equal" concession is backed by a requirement for true samples for comparative testing, it can be a useful tool for the buyer. Doubtful sources can be permitted to bid which might not be eligible under standards specifications, so it shuts up the complaint that "so and so didn't get a chance at the business." It introduces many innovations and developments that the buyer otherwise might not see.

Choosing a source from a test of samples submitted by vendors involves more than just testing the samples against a specified standard. We not only wish to know what offerings are above the line of acceptability; we want to get a complete picture of their comparative worth. Therefore, rather than confine ourselves to standard tests, we may devise practical tests to show how each of the different samples stacks up alongside the rest. We then apply a price index to give us the information as to which is the best for the money. These factors may be represented by numerical scores, the price score being in inverse ratio, of course. [See Exhibits 1 and 2.]

Using the aforementioned paper towel test as an example, we tabulate the samples, show their respective test results, and score each factor numerically according to the simple formula of proportion:

$$\text{Score} = \frac{(\text{Score factor}) \times (\text{Test results of sample})}{\text{Test results of sample which ranks highest in that particular}}$$

(Tests which score in inverse ratio, such as a time test for absorption in paper towels, are scored on the same computation as that for the price factor.)

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[1] Cf. Leslie F. Robbins, "Comparative Tests as a Measure of Value in Purchasing," *Purchasing*, February, 1939, pp. 38–39, 48.

EXHIBIT 1
Rating Table, Paper Towel Test

Sample	Size		Weight		Absorption, 150 points						Resistance to rubbing, 75 points				Strength						
					Quantity		Speed		Capillary		Dry		Wet								
	Square inches	Score, possible 25 points	Grams	Score, possible 50 points	Cubic centimeters	Score, possible 50 points	Sections	Score (inverse ratio), possible 50 points	⅟₁₆ inch	Score, possible 50 points	Strokes	Score, possible 25 points	Strokes	Score, possible 50 points	Pop	Score, possible 50 points	Total quality score, possible 350 points	Price per thousand	Score (inverse ratio), possible 175 points	Total score	Rank
1	133	23	4.62	41	21.2	44	480	0	6	10	153	11	22	13	6	27	169	1.057	166	335	7th
2	139	24	5.2	46	24	50	260	1	13	20	295	21	41	24	10	46	232	1.115	157	389	3d
3	142	25	5.7	50	22	46	30	50	32	50	346	25	32	19	11	50	315	1.092	160	4,5	1st
4	142	25	5.13	45	22	46	600+	0	6	10	139	10	85	50	7	32	218	1.119	156	374	5th
5	137	24	5.3	46	21.5	45	102	2	22	35	230	17	28	16	6	27	212	1.039	169	381	4th
6	142	25	5.65	50	24	50	560	0	5	8	273	20	59	35	10	46	234	1.084	161	395	2d
7	139	24	5.27	46	24	50	320	0	11	17	125	9	15	9	6	27	182	1.002	175	357	6th

EXHIBIT 2
Rating Table, Cotton Bed Sheet Test

Sample	Strands per inch, warp		Strands per inch, fill		Strength		Weight per yard before laundering	% filler	Weight per yard after laundering		Are ends of hems sewed		Quality score	Total score	Price per dozen net	
	No.	Score, possible 50 points	No.	Score, possible 50 points	Pop	Score, possible 100 points			Grams	Score, possible 100 points	Yes or No	Score, possible 25 points			Dollars	Score, possible 175 points
1	68	47	80	50	125	100	143.5	4.9	136.5	100	yes	25	322	466	14.88	144
2	68	47	80	50	125	100	142.8	4.8	135.9	100	yes	25	322	479	13.59	157
3	64	44	76	47	99	79	132.2	2.5	128.9	94	yes	25	289	452	13.17	163
4	68	47	80	50	101	81	124.5	0.4	124.	91	no		269	429	13.37	160
5	72	50	76	47	119	95	136.3	3.2	131.9	97			289	442	13.95	153
6	70	49	74	46	106	85	133.9	2.8	130.2	95	yes	25	300	468	12.72	168
7	68	47	76	47	104	83	129.9	3.8	125.	92	yes	25	294	458	13.05	164
8	68	47	80	50	125	100	142.4	4.9	135.4	99	yes	25	321	476	13.79	155
9	68	47	76	47	100	80	130.8	3.5	126.2	92	yes	25	291	466	12.23	175

We then apply the price index according to the formula:

$$\text{Price score} = \frac{(\text{Score factor}) \times (\text{Price of lowest priced offering})}{\text{Price of one being scored}}$$

or, for example:

$$\text{Price score of sample No. 5} = \frac{175 \times \$1.002}{\$1.039} = 169 \text{ points}$$

since 175 is the number of points assigned to the price factor and $1.002 per M is the lowest price quoted, and since $1.039 per M is the price on sample No. 5.

All of which may appear at first glance to be too complicated to bother with but on further thought will be seen to be essentially simple.

In the table, the quality factors are arbitrarily assigned, varying point values totaling 350 points. This device permits a buyer to place the relative importance of each quality factor where it ought, in his opinion, to be, in terms of his particular needs. Price, in this towel test, was considered roughly to rate half as important as quality and so was given 175 points. A minimum of acceptable quality should be established, below which goods are not wanted at any price. Thus the best sample in each tested qualification rates the full number of points assigned to that factor, and the other samples score in either direct or inverse ratio, their scores depending on how they compare with the sample which is best in that particular.

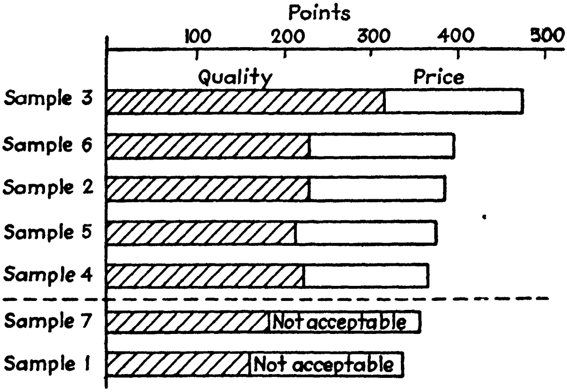

EXHIBIT 3.—Summary of results of testing paper towels.

A graphic representation of this process of choosing the source from samples tested might take the form shown in the accompanying chart. [See Exhibit 3.] In this graph, of those samples above the line of acceptability, No. 3 is indicated as the choice in relation to its price. The winner may not always be the best in quality test or the cheapest in price, but it is the most of quality for the money.

We choose our lawn hose by test and weighted scoring index. Our static pressure is high, up to 200 lbs. at times, hence we place more weight on the bursting strength score and less upon the other factors, such as quality of rubber of the inner tube, quality of outer jacket, type of cording construction, adhesion between plies, and thickness of wall.

We buy large quantities of sulphite bond paper and our selection is based on the results of a test with a weighted score, testing for pop strength, cleanliness (freedom from specks), color, and uniformity, and in case of mimeograph paper we also want to know about strike-through and offset. These factors are of approximately equal value. Sulphite bond is only used for temporary printed forms and notes and is not so much a quality item, so the price index is given a weight about equal to the total quality score.

We test carbon paper for weardown, curl, color, kind of paper stock, appearance of work done, smudging, and fading. There should be a careful balance between the weardown and the appearance. (It must not be so soft as to smudge, just to achieve longer wear.) This balance was worked out readily by weighting the score. We cannot use a carbon paper whose edges curl in this dry climate of ours.

We test typewriter ribbons, and again our dry climate is a factor, for the ribbons mostly dry out before we wear them out. When we find a ribbon that writes a neat page and dries out slowly, we do not worry if it has a lower weardown test. We test mimeograph ink and mimeograph stencils and many other commodities.

I feel that the human element is too great a hazard to leave the interpretation of the results to casual perusal. I would rather think through the problem of the relative importance of the various factors tested, set up my grading table, and let the samples grade themselves, than approach a close choice with all the prejudices and preferences for names and brands that the flesh is heir to. With the weighted score all of the considerations involved are positively present and in their rightful proportion.

Any convenient scoring number can be used which permits the desired relationship between the values of the factors to be expressed, but the value of price must be considered in relation to the *total* quality score. Thus if you wish to give price a value of one third of the total consideration, the lowest priced offering must then score half as many points on price as the total possible quality score. In scoring the various tested factors I use the proportion of the score for that factor that each sample achieves as compared with the sample which tested best for that factor. Thus the sample used as a standard of comparison may change as many as seven times in a test with seven distinct factors to be tested, for one sample excels in one respect and another in some other respect. In drawing up the form for recording the test results, I leave a blank square for the score at the side of each square for recording the test results.

Such a test does not have to be repeated every time this item is up for purchase. The price index may vary from time to time, but the testing procedure is only repeated when a significant change occurs in the quality of the offerings, or when some new brands enter the field. Laboratory tests of samples can be used in the absence of practical use tests or performance records, or should supplement them, according to the dictates of common sense in each particular case. Whether the comparison of samples is a practical test or laboratory analysis, the results can be made more reliable if they are translated into figures according to some carefully thought-out schedule of point scoring. Otherwise it is difficult to keep in mind the proper balance of several possible quality factors and difficult to make a truly scientific choice. Needless to say, a complicated test is not recommended for small or unimportant items. It involves time and expense, and its use must be justified by possible savings. However, there is no mechanical substitute for sound judgment and experience.

20. EVERETT MANUFACTURING COMPANY

PURCHASE OF SPECIAL ALLOY STEEL

For some years the Everett Manufacturing Company, located in Worcester, Massachusetts, had been recognized as a leader in the production of cotton textile machinery. Its machines not only were thoroughly reliable, but also possessed many innovations which made them particularly desirable. The company was always interested in the changing needs of its customers and had encouraged its salesmen to cooperate with them as much as possible in meeting their new requirements.

In January, 1934, the company was developing a new type of chucking machine with spindles which called for an alloy steel of unusual properties. Thus it was necessary for the company to find a supplier who could produce a steel to meet these requirements. Foremost among the possible suppliers was the Truette Steel Corporation. The initial amount required by the Everett Manufacturing Company was only 2 tons. However, the company had been offered the steel at a satisfactory price from the Truette Steel Corporation only on the condition that it contract to take an entire heat of 45 tons.

During the period from about 1913 on, the Truette Steel Corporation had developed and standardized several analyses of alloy steel which were particularly well suited for specific purposes which ordinary carbon steels would not serve. Since it was not possible to patent chemical analyses, these alloys were not patented, but they were advertised and sold under registered trade names. The company carried the alloys in stock in bars, and customers could ordinarily depend upon obtaining additional quantities as required. The company continued to improve these standard compositions from time to time, but the changes were slight and did not alter the essential properties.

It was part of the Truette salesmen's task to call upon actual and prospective customers and to convince them of the merits of the Truette special alloys as opposed to ordinary straight carbon steels. Often a salesman would demonstrate to the prospective user the superiority of Truette products. This usually involved actual tests at the user's plant. For this purpose the vendor supplied samples, for which, however, it made a charge.

This charge prevented the salesmen from leaving samples with firms which were not really interested in the product but which would accept free samples in order to get rid of the salesmen. In the company's opinion, furthermore, users appreciated samples more if they had to pay for them.

The salesmen, in addition to demonstrating and selling the standard compositions that the company had developed on its own initiative, occasionally discovered special needs of customers for which the standard compositions were not exactly suited. In such instances the Truette salesmen suggested that the users' engineers cooperate with the Truette production staff in trying to work out new compositions. The ability of the Truette Steel Corporation to work out special compositions was known to steel users, and requests for such service were not unusual.

The Everett Manufacturing Company, therefore, wrote the Truette Steel Corporation, giving in some detail the performance specifications which it desired in the steel for the spindles of its new machine and inquiring whether or not the steel company would be able to furnish an alloy meeting these requirements. The company stated further that, since sales of the new type of machine had not yet been developed, the initial order would be for only 2 tons, whereas, if the machine proved to be commercially successful, larger orders for steel would be necessary later.

In reply the Truette Steel Corporation stated that it believed it could develop a composition suitable for the spindles, but that the composition would probably not conform with any of the analyses which had already been developed for other purposes and would not therefore be available in small quantities for test purposes. This would necessitate the manufacture of a new heat of steel in accordance with the analysis which would be suggested for the spindles. The company did not care to submit a bid for only 2 tons. The minimum basic open-hearth heat would be 45 tons, and an order for less would be on an uneconomical basis. The steel company did, however, submit a tentative bid based on a manufacturing lot of 45 tons. The officials of the Everett Manufacturing Company considered the price a satisfactory one for a 45-ton lot but were hesitant to commit themselves to an order for more than the immediate requirement of 2 tons.

21. BOSWELL RUBBER COMPANY

SELECTION OF PAINT BY BRAND, SPECIFICATIONS, OR SAMPLE

The Boswell Rubber Company was a large manufacturer of tires and tubes. Early in 1934 the company decided to repaint the interior walls of the rooms in which four of its manufacturing departments were located. When a representative of the Bright Company, a small local paint manufacturer, made one of his regular calls on the Boswell company, he learned of these plans. The Bright Company thereupon requested and received the permission of the Boswell company to submit a quotation on the paint required for the project. The purchasing officer found this quotation to be 30% lower than a similar bid by the Boswell company's regular source of supply, the Adley Company, which had submitted a quotation in response to the request of the Boswell company. In the face of this price discrepancy the purchasing officer instructed one of his buyers to analyze the entire problem of the purchase of paint.

About every three to five years the Boswell Rubber Company examined both the exterior and the interior of its buildings to determine how much repainting was necessary. Since the buildings were of brick and concrete construction, the largest part of the repainting task involved the walls and ceilings inside the buildings. In the years in which it undertook major painting work, the Boswell company purchased from 25 barrels to 50 barrels of paint, of about 55 gallons each. During other years, however, the company purchased only negligible quantities, at the most not over 5 barrels.

The company's problem was complicated by the fact that generally throughout the plant and particularly in certain departments all painted surfaces were subject to deleterious action of chemical fumes, penetrating dust, steam, vibration, and hot, humid air. Moreover, the paint was applied to a variety of surfaces, including old and new woodwork, cement, brick, plaster, and metal. Under these conditions many kinds of paint tended to become seriously discolored, to check, and to lose their gloss. Paint with such characteristics not only failed properly to preserve the surface but was apt to become unsightly. Also, dull, discolored paint failed to reflect light properly and reduced the effectiveness of the company's lighting system, although, under the conditions prevailing in its plant, the Boswell company did not consider this a serious handicap.

Early in 1934 the management of the Boswell Rubber Company set up a schedule for the immediate painting of the interior walls and ceilings of four departments: the mill room, heater room, bead room, and inspection room. Painting in the first three of these departments was particularly subjected to fumes, vibration, heat, and dust. The paint used was to be white, with a semigloss (eggshell) finish. The Boswell company was to furnish the paint; it was estimated that about 50 barrels of paint would be required to complete the job. The labor necessary to apply the paint was to be furnished under contract by a reliable painting firm. Seven reputable concerns had bid on this work; the lowest bid was for slightly less than $2,000 while the highest was somewhat in excess of $2,700. All bidders were located in the immediate vicinity of the Boswell company's plant.

Upon receiving the quotations of the Bright Company and the Adley Company, the purchasing officer instructed his assistant, who handled purchases of paints and other maintenance materials, to canvass the paint market thoroughly for all suppliers who by reputation, location, and financial standing should be in a position to furnish the proper materials. In accordance with these instructions, the assistant prepared a list of 28 paint manufacturers whose salesmen he had interviewed at some time during the preceding year. From his records of conferences with these salesmen and in some instances from his correspondence with the manufacturers, the buyer prepared a list of 49 paint products manufactured by these companies. As a rule the salesman of each company had personally examined the conditions in the Boswell company's plant; and each company had at various times recommended either a paint which was claimed to have been specially designed to meet the requirements of the Boswell company, or a paint which was already standard to the manufacturer's line and bore its brand name. The buyer did not know the current prices of all products.

The paint buyer believed that all the companies on his list would prove to be satisfactory suppliers. Included in the list were most of the well-known national advertisers of paint products, as well as many less well-known companies specializing in the manufacture of industrial paints. Almost without exception each of the paint companies had on file testimonial letters enthusiastically endorsing the company both for its products and for its ability to advise customers on paint problems.

The buyer knew definite prices of 35 of the 49 paint products given on his list. These prices ranged from 77 cents to $3.30 a gallon. The prices on 24 of the 35 items, however, ranged from $1.50 to $2.50.

The paint buyer's problem was, therefore, to find some basis for selecting the paint which was the best in price and quality for the Boswell company's immediate purpose. One method was for the company, by making its own laboratory tests or by consulting a paint expert, to determine the proper combination and amounts of ingredients which the most satisfactory paint should contain. From these, there could be drawn up standard specifications on which all potential suppliers could bid. The paint buyer believed, however, that the use of specifications in the purchase of paint was not feasible. This objection arose partly because the exact composition of the best paint for any particular purpose was a matter of disagreement even among those whose business was the manufacture of paint, and partly because mere material specifications could not govern the skill with which the ingredients were combined.

It appeared to the paint buyer, therefore, that he must either (1) select one supplier in whom he had confidence and rely upon that supplier to choose the proper paint from the standpoint of price and quality, or (2) test a sample of each manufacturer's product in an effort to determine the ability of each to withstand the conditions present in the Boswell company's plant. The final decision on the entire paint problem was a dual function of the purchasing officer, who had charge of all purchases, and the factory manager, who, as chief production executive, was in charge of maintenance. In considering the two courses of action open to him, the buyer first appraised those paint suppliers concerning whom he had been able to form an opinion.

There were three companies in whose opinion he placed considerable confidence. The first of these was the Adley Company which had been the Boswell company's regular source of supply for nearly 10 years. The Adley Company's product had originally been selected because of a test conducted by Mr. Bright, who had been purchasing officer at the Boswell company for some years.

Mr. Bright had made the test by painting six strips on the walls of one department in the Boswell company's plant. As a result of this test, he selected, for use in the entire plant, the paint which in his opinion best met the conditions in that department. This paint, which was the product of the Adley Company, was given the brand name "Boswell Fumeproof Paint." During the succeeding 10 years the Boswell company had purchased this paint for nearly 100% of its maintenance requirements. The results were satisfactory, in the company's opinion, and there had been no cause for serious complaint by the Boswell company. The Adley Company had been able to sell Boswell Fumeproof Paint to other rubber manufacturers and advertised the use of its product in the Boswell company. In 1934 its quoted price to the Boswell company was $2.30 a gallon.

A second company to which the paint buyer was giving serious consideration was the Bright Company, a small paint manufacturing concern which had been organized by Mr. Bright upon his resignation as purchasing officer of the Boswell company. Mr. Bright claimed that because of his previous association with the Boswell company he was unusually well acquainted with its individual painting problems. In 1934 Mr. Bright offered to manufacture for the Boswell company a special paint which he claimed was peculiarly adapted to conditions in its plant. Although he did not support his contention with specific evidence, Mr. Bright pointed out that his small paint company specialized in developing industrial paints to fit particular conditions, and also reiterated the advantage which his intimate knowledge of the Boswell company's paint needs gave him in developing a paint that was especially suitable to those conditions. The price which he offered was $1.64 a gallon in quantities of 50 barrels or over. Mr. Bright stated that he was reasonably certain that his price was somewhat lower than the price of the Adley Company and claimed that he could offer this reduction primarily because the overhead of his small paint company was considerably less than that of the larger Adley Company.

A third company that the paint buyer considered to be a supplier in whom he might have confidence was the Laier Chemical and Paint Company, a large manufacturer of chemicals and associated products. Since 1932 the Boswell company had purchased annually over $200,000 worth of chemicals from this company, and had found it in every way a satisfactory supplier of chemicals. During the last half of 1933, in addition to the chemical salesman, a representative of the paint division of the Laier company began to call on the Boswell Rubber Company at regular monthly intervals. The Boswell company had at no time purchased any paint through this salesman, but relations between the paint buyer and the salesman had become friendly largely because of the aid which the salesman had been able to give in solving peculiar paint problems. It was the opinion of the paint buyer that the paint salesman of the Laier company knew more about paint than any other salesman who had ever called upon him, and he came to place every confidence in this salesman's opinion. For example, at one time the Boswell company had had great difficulty in satisfactorily painting a certain wall. Paints from both the Adley Company and the Bright Company were used without success. Mr. Bright criticized the worker who had applied the paint without stating specifically wherein he was at fault. Specific recommendations were offered by the salesmen of both the Adley Company and the Laier company; the latter's suggestion that, although apparently clean, the wall was still somewhat dirty proved to be correct.

In addition to these three companies there were several other concerns whose representatives had been calling on the paint buyer frequently. In regard to these companies the paint buyer expressed the following opinions:

Company 1.—This manufacturer had been offering three different types of products from three different subsidiary concerns. The buyer disliked dealing with this company because of the impossibility of being sure from which of the three subsidiaries he would receive shipments and what type of paint would be shipped.

Company 2.—This company was well known, with a nationally advertised product, but had never made any particular effort to sell to the Boswell Rubber Company.

Company 3.—This company was the parent company of the Adley Company, with which it had consolidated late in 1933. The paint products offered by both the parent company and its subsidiary were believed to be identical. In addition to paint, the parent company distributed a wide line of products, several of which it did not manufacture.

Company 4.—This company had furnished paint for use on the public buildings in the municipality in which the Boswell company was located. The paint had proved to be exceedingly unsatisfactory in regard to durability.

Company 5.—The paint buyer was antagonized by this company's salesman, who sold roofing compounds and other products as well as paint. He had told the same long-drawn-out sales story three or four times and had succeeded only in irritating the buyer. In spite of his personal dislike for the salesman, the buyer wished to give every consideration to this company because its product was reputed to be excellent.

Company 6.—The salesman of this concern had for a considerable period wished to paint a sample section of the wall in the department in which deleterious action of chemical fumes was most prevalent. This salesman claimed that, although this paint was manufactured with a linseed oil base, it would resist discoloration by chemical fumes and heat. The paint buyer believed, however, that only paint manufactured with China wood oil would retain its whiteness. In this opinion, he was supported by most of the salesmen whom he had interviewed.

Company 7.—The paint buyer believed the branded paint which this concern offered the Boswell company to be unsatisfactory. It was a paint which was prepared by adding water. The paint buyer thought this method of preparation would make the paint brittle and cause it to crack and flake off under conditions of vibration and hot, humid air. Also the buyer felt that the salesman tended to stretch the truth, being ready to claim for the product almost anything which he believed would get him an order.

Company 8.—This concern manufactured a cold-water paint, which the paint buyer believed was unsatisfactory.

Company 9.—This company had both a good product and a good salesman. It had supplied the Boswell company with paint prior to the tests conducted by Mr. Bright. In the test this company's product showed nearly as good results as the Adley Company's product.

Company 10.—This company was also a national advertiser and was reputed to manufacture excellent products at reasonable prices. During the preceding three years, however, this company had had four different representatives calling on the Boswell company, each of whom was young and knew little or nothing about paint.

Company 11.—This company had no salesmen and for years had maintained its contact with the Boswell company through direct-mail advertising.

Company 12.—Although the salesman of this concern had been in the field for some time, he had an inadequate knowledge of his product. Also the paint buyer had gained the impression that he was somewhat lazy.

Company 13.—This concern was reputed to manufacture good products, but the salesman made an unfavorable impression. This salesman was certain that no one else manufactured good paint, and became extremely pugnacious if the buyer implied that he was already buying a paint of good quality. Also, if forced to wait for a few moments before interviewing the buyer, the salesman showed considerable irritation.

Company 14.—This was a well-known company whose salesman was convinced that his products were the best in the field and was ready at any time to prove this claim by test, though he had never been given the opportunity.

The second means of determining the proper paint for use in the Boswell company's plant was to test all the 49 paint products included in the paint buyer's list. The buyer gave considerable thought to laying out a plan for such a test and decided upon five elements which he believed should be included if the Boswell company were to conduct such a test. The procedure which he believed might constitute a valid test is outlined below:

1. Samples to be tested must be collected from each company. In requesting samples from the companies on the paint buyer's list, the Boswell company would indicate the conditions under which the paint was to be used by describing the type of chemicals used in the departments in which the tests were to be made, the temperature, humidity, and other conditions present, the general character of the surface to which the paint was to be applied, and the fact that all painting at the Boswell company was applied by brush or by the spray method, depending upon conditions and location of the surfaces to be painted. Representatives of the paint manufacturers would be allowed to inspect the surfaces to be painted, if they so requested.
2. Upon receipt of sample cans of paint, all identifying marks must be removed and replaced with numbers. Only the paint buyer would know the true identity of each of the numbered samples. Instructions for applying, however, were to be copied from the wrappers on the cans so that each sample would be applied exactly according to the manufacturer's own directions.
3. The samples would be applied to pieces of wood ½ inch by 6 inches by 48 inches, all of similar type and grain. Each piece of wood was to have on each flat surface the proper type of undercoat as specified on the painting instructions given by the manufacturer. The undercoat on one side, however, was to be white and on the other, yellow. One coat of the sample paint would be applied to each side. When each strip of wood was dry, it would be cut into four pieces, ½ inch by 6 inches by 12 inches.
4. These four pieces would then be placed in the following locations: one in the laboratory, one in the heater room, one in the mill room, and one in the bead room. Each strip was to be examined every three months by a committee of Boswell company officials, especially appointed for this purpose, consisting of the purchasing officer, the maintenance superintendent, the supervisor of engineering, the chief chemist, and the painting foreman. The strips were to remain on test until definite results could be determined. The duration of the test was expected to be in excess of eight months.

5. The analysis of results would present the most difficult problem. The paint buyer listed five characteristics for which each sample was to be tested:

- *a.* Durability. Each sample strip would be tested for this characteristic by comparison with the strips of other samples to see which sample had checked the least. Examination was entirely visual.
- *b.* Initial whiteness. The standard of this characteristic was the whiteness of a sheet of letterhead paper.
- *c.* Hiding power. Each strip was to be examined visually to determine the ability of the sample to cover the yellow undercoat.
- *d.* Color retention. No sample was considered acceptable which acquired a noticeable degree of discoloration.
- *e.* Coverage. In this instance "coverage" meant the area that a given quantity of paint would cover satisfactorily. No actual test of this characteristic would be made, but the samples were to be rated on the basis of hiding power as described above and of the worker's report concerning ease of application.

From such a test the paint buyer believed it might be possible to select two or three companies whose products had surpassed all others. After narrowing down potential suppliers to this extent, the company would then purchase its entire requirements from the company whose price was lowest. The paint buyer believed that a test to insure that the paint actually furnished was identical with the sample was both impractical and unnecessary.

There seemed to the paint buyer to be two advantages to testing paint as against selecting one outstanding manufacturer. Most important, testing would enable the Boswell company to find definite answers to the two following questions: (1) Are the cheaper white paints suitable for use by the Boswell company? (2) What paint should the Boswell company use where discoloration is a particularly serious problem? In addition, as a result of the test, the Boswell Rubber Company would be in the position of having definite reasons for refusing to buy paint from the other companies. The purchasing officer of the Boswell company was convinced that he should have a definite reason for refusing to give an order to a salesman. He would also be in a position to explain to the sales department why he had purchased a certain brand of paint without giving weight to reciprocity.

22. BLUFORD SPRING CORPORATION (B)

PURCHASING OIL BY BRAND, SPECIFICATIONS, OR SAMPLE

The Bluford Spring Corporation manufactured high-quality springs of all kinds. The company was composed of five virtually independent divisions, all of which, however, manufactured the same types of products. The five divisions were located in Pontiac, Michigan; Lancaster, Pennsylvania; South Bend, Indiana; Chicago, Illinois; and Springfield, Massachusetts. Although the manager and the purchasing officer of each division controlled the purchase of all materials and supplies for the plants in that division, some degree of coordination of purchasing activities throughout the corporation was achieved through a purchasing committee composed of the purchasing officers of the various divisions. This committee early in 1938 considered some of the problems involved in purchasing oil.

The types of oils required by the corporation's plants were roughly classified as follows: (1) fuel oils for firing, annealing, and drawing furnaces; (2) fuel oils for firing the boilers which furnished process steam and heat; (3) oils for cooling and lubricating tools and stock during cutting, grinding, sawing, drawing, stamping, coiling, and rolling; (4) oils for hardening and tempering; and (5) oils for lubricating machinery and preventing rust.

Although each division manufactured identically the same products, and although production processes were on the whole similar, discussion in the purchasing committee revealed that there was no consensus of opinion in regard to the type and grade of oil specified for a particular need by production officials of the five divisions. At one time, for example, the five divisions had been buying five different brands of a certain grade of cutting oil. Aside from any question of comparative quality, the prices paid for this oil varied greatly. Thus Division 1 paid 38 cents a gallon; Division 2, 42 cents a gallon; Division 3, 61 cents; Division 4, 23 cents; and Division 5, $1.15.

The problem, therefore, was to find some means of deciding what type and grade of oil was best suited to each of the Bluford Spring Corporation's various needs. The committee delegated one of its members, Mr. Smith, purchasing officer of the Springfield division, to work out an answer to this problem.

Mr. Smith reasoned that there were four possible ways for the Bluford Spring Corporation to determine the oils it should buy: (1) select one supplier who by reputation, size, and experience should be qualified to supply satisfactory oils for all the company's uses; (2) list the brands of oils being bought by the five divisions to fill individual needs and select, for each need, the brand which, while giving satisfactory performance, was the lowest in price; (3) test samples submitted by the various suppliers, and select oils on the basis of these tests; and (4) draw up standard specifications, describing the properties required for each type and grade of oil, as a basis for selection.

As a first step in analyzing these four proposals, Mr. Smith examined the oil purchases of his own division. He found that he was buying the 32 brands of oil shown in Exhibit 1. Ten of these were supplied by four leading, nationally known oil refining companies, and 18 were procured from seven companies each of which specialized in the sale of certain types of industrial oils. Of the four remaining, three were purchased from three local dealers and one from the manufacturer of the equipment on which the oil was used.

Only the four refining companies could have supplied all the Bluford Spring Corporation's oil requirements. In selecting one outstanding firm as the company's oil supplier, Mr. Smith was, therefore, necessarily forced to limit his selection to the four leading refiners already on his list plus such other similar companies as he might wish to consider.

Mr. Smith was, however, undecided as to how to set up a basis for determining the most desirable supplier. All four of the leading refiners already on his list were generally known as reliable firms. Trade gossip as furnished to Mr. Smith by other purchasing officers led him to believe that, while differences of opinion might exist as to which of the firms was the best, there was little chance that any one of them would prove unsatisfactory. Also, all these firms were desirous and apparently capable of making a thorough and scientific analysis of the Bluford Spring Corporation's oil needs. Each of them had facilities sufficiently large and spread over a broad enough area to give assurance of adequate and reliable service. Over a period of years all had maintained strong financial positions which led Mr. Smith to believe that they were reasonably certain to remain in business as dependable sources of supply.

Although somewhat at a loss to decide how to choose any one supplier, Mr. Smith recognized that there were certain advantages

EXHIBIT 1
BLUFORD SPRING CORPORATION
Oil Purchases, Springfield Division, 1937

Brand	Average price paid per gallon	Quantity used	Use
1	$0.51	3 barrels*	Steam pumps
2	0.97	50 gallons	On spindles
3	0.67	55 gallons	Used in the hydraulic system of a Norton grinding machine
4	0.095†	55 drums‡	For link belts
5	0.02§	10 cans	Typewriters and micrometers
6	0.25§	4 cans	Scales
7	0.14	250 barrels	Wire lubrication during coiling at rolling mill department
8	0.38	2 barrels	For setting irons
9	0.37	4 barrels	Electric motors
10	0.63	2 barrels	Wire lubrication for difficult coiling jobs
11	0.14	50 barrels	Rust prevention
12	0.24	2 barrels	General lubrication
13	0.34	1 barrel	Hand screw machines
14	0.37	40 barrels	Quenching after salt hardening
15	0.43	2 barrels	Cutting and stamping
16	0.1075†	1 drum	Hand screw machines
17	0.455	50 gallons	Grinding and sawing
18	0.23	10 barrels	General lubricating, shafting, etc.
19	0.38	75 barrels	Oil treating
20	0.51	12 barrels	Slushing during rolling and oiling before shipping
21	0.95	15 barrels	Rust prevention after salt hardening
22	0.16†	2 drums	Bearings and grease cups
23	0.57	2 barrels	For compressors
24	0.25	30,000 gallons	Quenching
25	0.72	10–12 barrels	Cars and trucks
26	0.095†	1 drum	Herringbone gears on mill drives
27	0.45	50 gallons	Pipe threading machines
28	0.05	600,000 gallons	Heating and oil firing
29	1.22‖	50,000 gallons	Heating
30	0.14	30 barrels	Rolling
31	1.35	1 drum	Difficult drawing
32	7.00	10 gallons	Heat resistance

* A barrel contains approximately 50 gallons.
† Price per pound.
‡ A drum contains about 400 pounds.
§ Price per can.
‖ Price per barrel of 42 gallons.

to selecting some one of these firms as his sole source of supply for oil. It was to the interest of the company selected to make an expert analysis of the Bluford company's oil needs sufficiently often to enable it to suggest new or improved oils which would result in savings to the user. Only by insuring that the oils which it furnished were satisfactory to the Bluford company could the oil supplier have assurance that it would continue to hold the Bluford company's business. Also, by frequent contacts with the purchasing officers of the corporation, with production officials, and with factory operatives, the experts of the oil company should become well acquainted with both the Bluford Spring Corporation's needs and the individual preferences of the employees.

Mr. Smith reasoned that it was to the interest of any of the large oil companies to maintain the quality of oil shipped to the Bluford company. The entire responsibility for the satisfactory performance of the oils would rest on the supplier. In addition to being the manufacturer of the oil, he would have suggested the particular grade and type to be used. Continuance of the relationship would be dependent so largely upon the confidence of the Bluford company in the oil supplier that one bad shipment might well jeopardize the entire relationship. Also, by concentrating all its oil purchases with one company, the Bluford Spring Corporation might pay slightly lower prices than under its existing plan of buying from many suppliers and might regularly be informed in advance of prospective price changes. Mr. Smith knew that some manufacturing companies did concentrate their entire oil purchases with one supplier, but he did not know how they had selected their suppliers or how successful the concentration of such purchases had proved to be.

Although recognizing these advantages, Mr. Smith saw no valid reason for selecting any one company over the others. Unless he was able to furnish a valid reason, Mr. Smith believed that, even in his own division, engineers, superintendents, and foremen, many of whom had particular preferences for certain brands of oil, would refuse to accept a plan to concentrate purchases with any one company. Further, under these circumstances Mr. Smith believed that he would have extreme difficulty in convincing the other four purchasing officers, each of whom would probably have other preferences.

The second possible way to determine what oils the Bluford Spring Corporation should buy was to prepare a list of the brands actually used by the plants of each division and to select, for each individual use, the brand which, while giving satisfactory service, was lowest in price. Mr. Smith believed this procedure was feasible. The examples given on page 165, showed that some divisions were paying less than others for oil that was used for the same purpose. Mr. Smith knew that in 1938 the two plants of his division were using for certain cutting operations an oil that cost 14 cents a gallon, while the division with the next lowest cost was using 35-cent oil. As there had been no factory complaints, Mr. Smith believed that the 14-cent oil must be satisfactory for this particular purpose and that it could, therefore, be purchased with entire confidence for the other plants. If a similar analysis was made of the oil used for each of the company's purposes, Mr. Smith reasoned that the lowest-price oil of satisfactory quality could be purchased throughout the corporation.

This method of determining the oils which the Bluford Spring Corporation should buy had certain advantages. Being dependent largely on an interchange of information, it fitted readily into the function of the purchasing committee. In addition, it enabled the corporation to use the results of its own factory experience rather than depend upon the ideas and theories of outside consultants. Finally, the method did not involve expensive laboratory or factory tests.

There was, however, at least one serious disadvantage to this method. Many oil suppliers conducted only a local business. Nearly half the suppliers from whom Mr. Smith's division was buying oils, for example, were essentially local in their operations. Although shipments to the other divisions could probably be arranged, Mr. Smith expected that considerable shipping expense would be involved. The freight rate on shipping a barrel of oil from the vicinity of Mr. Smith's division to Detroit was roughly $1 per hundredweight. An empty 50-gallon barrel weighed roughly 75 pounds and the weight of oil was approximately 7½ pounds per gallon. Because of this shipping expense, Mr. Smith believed that any satisfactory method of determining the oils which the Bluford Spring Corporation should buy must make it possible for each division to use such local distributors or local representatives of refineries as were available.

The third method of determining the oils to be bought for each of the company's uses was to test samples under actual use or in the laboratory. The samples would be secured from various suppliers selected by the Bluford company. The most important advantage of this method, assuming the tests gave valid results, was that the Bluford company could determine with some definiteness the worth of each of the products. In addition, from the process of testing the Bluford company was likely to gain considerable information of value in improving its methods of using the various oils. Also, if an oil performed satisfactorily during any test that might be set up, the purchasing officer would have a valid argument with which to convince the production department that that oil should be adopted.

The disadvantages of this method, however, made it appear not feasible. The chief difficulty would be to set up tests, either actual or laboratory, which would give valid results.

If the various products were tested under actual factory conditions, the chief problem would be one of comparability. Changes in the rate of production, in the type of work, and in the skill of the workers would all have an effect upon the results. Further, testing under actual factory conditions usually would involve a long period of time before definite results were revealed. For example, testing an oil for lubricating the bearings on a machine would be virtually impossible under actual conditions. The value of a certain oil as a lubricant could be based only upon its ability to eliminate wear and friction. These results would be revealed in an actual test only after a period of at least several months if the oil was at all satisfactory as a lubricant. A further disadvantage was that testing under actual conditions often involved large samples. For example, it would be impossible to test a few gallons of fuel oil for a furnace. If the test was to be valid, it would be necessary to procure a large quantity, probably not less than a tank car, which would necessarily involve considerable expenditure by either the Bluford company or its potential supplier. Moreover, such a test would require some regulation of the burners, which would also involve expense.

In addition to these problems of making satisfactory tests under actual factory conditions there was the question of persuading factory officials to make such tests. The success of a quenching oil, for example, in performing its task was exceedingly important in its effect upon both the volume of production and the quality of products manufactured. The factory officials were likely to protest any shift in suppliers and, in any event, probably would not acquiesce to any request for a temporary shift during the life of some test.

Laboratory tests also involved certain disadvantages. Mr. Smith knew that various types of wear tests for lubricating oils had been devised, but that, while such tests were known to reveal some accurate results, they still were subject to error. Quenching oil would be the most difficult of all to test in a laboratory. Mr. Smith knew that even the largest companies, having thoroughly capable and specialized research staffs, believed that laboratory tests of quenching oil were of questionable reliability. Mr. Smith's own experience supported this opinion. For example, the Bluford corporation had, after extensive laboratory tests, changed the type of quenching oil used for a certain purpose, adopting one which the production department, the purchasing department, and the company's laboratory were convinced would result in operating savings to the company. Under actual conditions, however, the oil, which under laboratory tests had proved to be satisfactory, broke down so rapidly as to cause an excessive rate of consumption.

The fourth method of determining what oils the corporation should buy involved the development of specifications accurately describing the properties necessary for a satisfactory oil for each of the corporation's uses. In drawing up such specifications Mr. Smith necessarily would be required to fall back upon such information as he could secure from the company's research laboratory, from the experience of maintenance and production officials, and from his own previous dealings with oil suppliers. All the products used by the divisions for each purpose would be examined in the laboratory to determine which from a theoretical standpoint should be the best oil for that purpose. These results would then be checked by the experience of the various divisions in the use of the oils. Differences in the characteristics of the brands of oil used by the divisions would then be discussed from the standpoint of the maintenance or production officials who used them. The preferences of these men would be analyzed and an effort would be made to express the preferences in specific terms.

As an example of what he wished to do, Mr. Smith drew up the specifications shown in Exhibit 2. These specifications covered those elements which the production and maintenance departments, the purchasing department, and the laboratory agreed should be present in satisfactory oils. If this method of selecting oils was tentatively adopted, Mr. Smith planned to draw up no other specifications than these three for the time being, and to experiment with them to see whether these specifications would enable him to buy oils which would properly perform the functions given.

Mr. Smith recognized that there were disadvantages in this method. Two of the principal disadvantages concerned the supplier. First, a supplier, if he had lived up to the specifications, was not responsible should a certain oil fail to be satisfactory. That responsibility necessarily devolved upon the Bluford Spring Corporation. Second, some sort of test was necessary if the Bluford company was to be sure a supplier was living up to every detail of the specifications. Probably it would not be necessary to test each shipment, but some type of infrequent sampling would be necessary. The problem was complicated by the fact that the company's laboratory was already overburdened with the testing of steel and ferrous alloys which were used as the basic raw materials in the manufacture of the company's products.

The purchasing officer recognized also that drawing up specifications involved many of the disadvantages present in testing samples. If his company's experience revealed that it was virtually impossible to test a sample of quenching oil as to all the characteristics that were necessary for satisfactory performance, this result would indicate also that it was difficult if not impossible to draw up specifications describing these properties. By using specifications, however, the Bluford Spring Corporation would know definitely what it was buying, and if the oil was not satisfactory for its purpose, the company could, from laboratory tests and factory experience, make such changes in the descriptions as were necessary. Frequent mistakes might be made, but since the specifications resulted from the combined efforts of the company's laboratory experts, the production department, and the purchasing department, Mr. Smith believed that he could expect continued cooperation from them even though it might take time to develop accurate specifications.

In addition, there were several obvious advantages to buying by specifications. The company would no longer be limited to a few suppliers, since the oil specified could be purchased from any large refiner irrespective of brand names; thus, there would be increased assurance that a supply of oils would always be available. Lower prices should result from the company's ability to get a larger number of quotations, and because all companies were competing on identical specifications, the purchasing officer should have no difficulty in selecting the most desirable source of supply. Mr. Smith expected that further savings would result from buying by specifications, as he suspected that certain divisions of the corporation had in some instances been paying for higher quality than was really necessary. Specifications would insure that throughout the corporation oil was being bought of only that minimum quality that was absolutely necessary for the satisfactory performance of the oil. Finally, Mr. Smith knew that some of the most progressive companies were using specifications as a method of buying oils of all kinds, and that, despite the difficulty of drawing up accurate and complete specifications, their use had been successful in some cases.

EXHIBIT 2

BLUFORD SPRING CORPORATION
Sample Specifications for Oil

Specification S-9

Section I.—This specification covers a general purpose oil used by the Bluford Spring Corporation.

Section II.—Oil purchased under this specification must be properly refined petroleum oil. It shall not contain water, sediment, acid, soap, resin, or any substance not derived from petroleum.

Section III.—The flashing point, Cleveland Open Cup, shall not be below 335°F.

Section IV.—The firing point, Cleveland Open Cup, shall not be below 385°F.

Section V.—The viscosity, Saybolt Universal at 100°F., shall be between 80 and 100 seconds.

Section VI.—The pouring point shall not be above 35°F.

Section VII.—The oil shall not be darker than No. 3 N. P. A.

Section VIII.—The oil shall not corrode any metal used for machine construction.

Section IX.—The oil shall not contain acid to exceed an equivalent of 0.05 milligrams of potassium hydroxide per gram of oil.

Section X.—For the following purposes:

a. Thinning down cutting oils.
b. As a fluid medium for transmission of power to presses, bailers, and elevators, etc., where the equipment is not exposed to temperatures below 40°F.
c. Oil control on telescopic band mills.
d. Trimmer pneumatic controls in saw mills.
e. Floor oil.
f. Quenching oil.
g. Rust preventive in the factories.

NOTE: All tests shall be run in accordance with the American Society for Testing Materials' standards.

November 1, 1938

EXHIBIT 2 (*Continued*)
BLUFORD SPRING CORPORATION

Specification S-9A

Section I.—This specification covers oil which will be used primarily as a blended quenching oil.

Section II.—Oil purchased under this specification must be a properly refined petroleum oil. It shall not contain water, sediment, acid, or resin. It shall be blended with a minimum of 4% Degras.

Section III.—The flashing point, Cleveland Open Cup, shall not be below 335°F.

Section IV.—The firing point, Cleveland Open Cup, shall not be below 385°F.

Section V.—The viscosity, Saybolt Universal at 100°F., shall be between 90 and 110 seconds.

Section VI.—The pouring point shall not be above 35°F.

Section VII.—The oil shall not be darker than No. 3 N. P. A.

Section VIII.—The oil shall not corrode any metal used for machine construction, nor shall it have noticeable odor.

Section IX.—The oil shall not contain acid to exceed an equivalent of 0.05 milligrams of potassium hydroxide per gram of oil.

Section X.—This oil is to be used for the following purposes:

a. A quenching oil where it is possible for moisture to be mixed with the oil in use.
b. As a rust preventive for springs in transit.

NOTE: This oil is not to be used where work is quenched from cyanide or other alkali which will saponify Degras and make it useless. In such an event, S-9 shall be used.

NOTE: All tests shall be run in accordance with the American Society for Testing Materials' standards.

November 1, 1938

Specification P-26

Section I.—This specification covers a general purpose oil used in the lubrication of shafting and machinery.

Section II.—Oil purchased under this specification must be properly refined petroleum oil. It shall not contain water, sediment, acid, soap, resin, or any substance not derived from petroleum.

Section III.—The flashing point, Cleveland Open Cup, shall not be below 375°F.

Section IV.—The firing point, Cleveland Open Cup, shall not be less than 415°F.

Section V.—The viscosity, Saybolt Universal at 100°F., shall be between 245 and 275 seconds.

Section VI.—The pouring point shall not be above 30°F.

Section VII.—The oil shall not be darker than No. 5 N. P. A.

Section VIII.—The oil shall not contain acid to exceed an equivalent of 0.05 milligrams of potassium hydroxide per gram of oil.

Section IX.—The oil shall not corrode any metal used for machine construction.

Section X.—The emulsion test shall show a maximum of 2 cc. after five minutes.

Section XI.—Uses:

a. General shafting and machine use.
b. Ring oil bearings of electric motors.
c. Machinery not equipped with oil circulating systems.
d. Hyatt roller bearings where bearing housings are practically leak-proof, subject to medium and high speeds.
e. All types of shaper bearings equipped with an oil bath, and planer bearings operating at a temperature exceeding 160°F.

NOTE: All tests shall be run in accordance with the American Society for Testing Materials' standards, except the emulsification test, which shall be in accordance with the standards of the General Motors Corporation, Page D 9.

November 1, 1938

EXHIBIT 3
BLUFORD SPRING CORPORATION
Description of Oil Tests*

The most common tests used in rating oils are as follows:

1. *Viscosity.*—Viscosity is tested in a Saybolt Universal Viscosimeter. In this machine viscosity is measured by observing the time in seconds required for 60 cc. of the oil being tested to flow through a standard orifice at various temperatures, usually 100° F., 130°F., and 210°F. Other somewhat similar testing machines are the Redwood, Barbey, and Engler.

Other ways of rating viscosity are also occasionally used. Absolute viscosity is computed from the following formula:

$$\text{Viscosity} = \frac{\text{absolute viscosity}}{\text{specific gravity}}$$

Viscosity index is computed by comparing the viscosity of the oil being tested at 100° F. with the viscosity of an average Pennsylvania oil and the viscosity of an average coastal oil. An oil with a high viscosity index, or V. I., as it is generally known, does not thin out at high temperatures or congeal at low. A high viscosity index is generally desirable for most lubrication purposes. Neither absolute viscosity nor viscosity index is used to any great extent.

2. *Specific Gravity.*—The specific gravity of an oil gives little indication of its quality, but to an expert oil engineer specific gravity plus viscosity index gives a reliable indication of the crude from which the oil was refined.

3. *Flash and Fire Point.*—Flash and fire points are determined in an open cup testing machine, the most commonly used being the Cleveland Open Cup. The flash point is the temperature at which oil heated in the open cup will flash momentarily when an open flame is brought in close proximity. The fire point similarly is the higher temperature at which the oil will burn continually when exposed to an open flame. These tests are important as indicating the rate of evaporation which will take place when oil is used for purposes raising it to high temperatures.

4. *Pour Point.*—Pour point is determined by progressively lowering the temperature of an oil to see at what point it will no longer retain a freely flowing condition.

5. *Cloud Point.*—Cloud point is determined by lowering the temperature of an oil to see when separation of waxes present in the oil or cloudiness would occur. This test is misleading if any appreciable quantity of water is present in the oil. The test does give an indication, however, as to whether the oil has been dewaxed as nondewaxed oils have a high cloud point.

6. *Emulsification.*—Emulsification is tested by mixing the oil being tested with water or steam. The oil is then rated for its emulsification properties by the number of seconds required for the water and oil to separate. For most general purposes this test is of little value, but when oil is used for lubricating turbines or reciprocating steam engines, it is of value. It is also an essential characteristic for oils that are to be mixed or emulsified with aqueous solutions for use as cutting fluids. Also this test gives some indication of the quantity of acids, alcohol, and other matter contained in the oil, all of which retard the rate of separation.

7. *Precipitation.*—Precipitation is tested by centrifuging 100 cc. of a mixture composed of the oil being tested and petroleum naphtha to see how much by volume is separated into layers of oil and various sludges. This sludge is usually composed of tar and other asphaltic compounds.

8. *Corrosion.*—Corrosion is tested by submerging for three hours a clean strip of pure polished copper in the sample being tested at 212°F. Upon completion of the test the strip is washed and examined to see how much discoloration and pitting has taken place.

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* Information obtained from an article, "How to Beat Friction," by E. J. Tangerman, *Power*, June, 1937, pp. 317–322, and from the American Society for Testing Materials, *Book of ASTM Standards*, Part II, 1936. Material used here by permission.

EXHIBIT 3 (*Continued*)
BLUFORD SPRING CORPORATION

9. *Water.*—If an oil is at all cloudy this may indicate the presence of water. If upon heating the oil to above 212°F. the cloudiness disappears, the presence of water is confirmed. For most purposes the presence of small quantities of water is relatively unimportant, but where wick feed oilers are used, water is undesirable as the wick will absorb the water faster than it will the oil, thereby impeding the capillary action of the wick.

10. *Specific Heat.*—Specific heat is tested in an enclosed bomb testing apparatus. A charge is exploded in the bomb and the specific heat of the oil being tested is rated by the number of B.t.u. which a pound of the oil will absorb per degree of temperature rise in the bomb. This test is important as giving an indication of an oil's ability to cool metal surfaces.

11. *Sulphur Test.*—Sulphur content of an oil is tested in an enclosed bomb tester in which the oil being tested is burned in the presence of distilled water and other reagents. High sulphur content in an oil usually tends to promote sludge, but authorities are not definite as to the real significance of the presence of this element in an oil.

12. *Carbon Residue.*—The carbon residue in an oil is found by heating the oil to be tested in a Skidmore iron crucible sufficiently to drive off the distillates, leaving the nonvolatile carbon residue. By comparing the weight of these deposits with that of the original sample the percentage of carbon residue can be found. Carbon residue is important when oil, particularly lubricating oil and fuel oil, is operated at high temperatures through small apertures as the carbon deposits may eventually close the apertures, resulting in inadequate lubrication or failure of the fuel feed apparatus.

13. *Neutralization Number.*—Neutralization is measured by the amount of alkali necessary to neutralize whatever acids are present in one gram of oil. This test is of importance as acids may lead to corrosion and promote the formation of sludges, emulsions, and deposits. Neutralization number also reveals to some extent the degree of refining which the oil has undergone.

14. *Saponification.*—Saponification is determined by boiling a sample of oil mixed with certain reagents. The test, by separating such animal or vegetable fats as may be present, makes possible the determination of the percentage of such fats as compared to the total volume of mineral oil.

15. *The Thermal Value of Fuel Oil.*—This quality is tested in any of a number of varieties of enclosed bombs. Thermal value is determined by the number of B.t.u. given off by exploding a measured quantity of oil in the bomb.

16. *Accelerated Service Tests.*—Various types of accelerated service tests have been designed for testing lubricants and cutting fluids. All of these involve measuring the amount of wear which occurs when two surfaces lubricated by the fluid being tested are rotated rapidly under pressure. All of them give some indication of lubricating properties but oil engineers apparently believe that such tests do not tell the entire story.

23. SISKIYOU POWER COMPANY (A)

MATERIALS SUBSTITUTION

At the instigation of the purchasing department, the Siskiyou Power Company in 1929 adopted aluminum as a substitute for copper in the construction of switch cells. At that time the lower cost of aluminum per atomic unit made possible a substantial saving in the original investment. In May, 1930, the company planned to construct a bus structure; the materials required were for all practical purposes the same as those used in switch cells. Since the market price of copper had receded to a point sufficiently low to bring copper into close competition with aluminum, and since the engineering department would accept either of the two metals, the purchasing department was faced with the problem of selecting one of the two metals.

The purchasing department of the Siskiyou Power Company was organized in 1923 to assume complete functional authority. This form of organization achieved noteworthy success. The company estimated that savings, based on annual purchases which ranged upward to $26,000,000, would be not less than $1,500,000 per year over a 10-year period. The cost of operating the purchasing department, in addition to such expense as would be incurred under the simplest form of buying procedure, would approximate $100,000 per year. One of the duties of the purchasing department was to bring about economies through substitution of equally or more effective materials for those commonly accepted as standard by the company.

For a number of years the Siskiyou Power Company had experimented with various materials for use in the construction of switch cells. About 50 of these cells were in operation in 1930, and others were being added with the construction of new substations. Switch cells required housings possessing the qualities of mechanical strength, heat conduction, fire resistance, and in some cases nonmagnetic property. Each switch cell contained an oil circuit breaker which included a tank filled with oil to quench the arc when the circuit was broken. Under normal conditions the oil was not subjected to intense heat. Overloads, however, such as would result if lightning struck the power lines, increased the fire hazard appreciably and necessitated maximum protection. Concrete, gypsum, iron (satisfactory only when the load was light), and other materials had been tried at various times without effecting the desired results. Despite the costs involved, copper was finally adopted. Each switch cell required from 1¼ to 2 tons of ¼-inch and ⅛-inch copper plate.

Late in 1928 the company was planning the construction of a new power house which required the installation of 10 switch cells. The metal buyer computed the cost of the copper involved. Since one of his duties was to seek economy through the use of new materials, it occurred to him that aluminum, which he had previously found a satisfactory and economical substitute for copper, might well be used as a substitute for copper in the construction of switch cells. He therefore prepared a comparative estimate of the cost of aluminum and copper plate of the same dimensions. The result favored the use of aluminum by a substantial margin.

The approval of the engineering department was required before such a change in material could be made, and the buyer experienced some difficulty in interesting this department in the use of aluminum. So far as was known, aluminum had never been used in the manner proposed. Ordinarily a considerable period of time, sometimes as long as three years, was required to effect the adoption of a substitute metal. In this case, however, because of the possible economy, the engineering department agreed to make a preliminary examination and, if the result warranted further experimentation, to test the metal under the most severe conditions. The experiment was highly satisfactory. Aluminum was found to have excellent conductive properties and strong electrical conductivity. However, since the qualities of aluminum were inferior to those of copper in resistance to melting or volatilization, and since the engineers desired a high factor of safety on mechanical strength and heat resistance, it was necessary to use ¼-inch aluminum plate instead of ⅛-inch copper plate. Despite this increase in bulk, the weight of aluminum required to construct the 10 cells was but two-thirds of the total required copper. The atomic weight of aluminum sheeting was one-third that of copper. In December, 1928, copper ingots were quoted at 16 cents per pound and copper sheets at 23 cents. Aluminum ingots sold for 24.3 cents per pound, and plates were 27 cents.

QUOTATION SUMMARY SHEET

DATE 2/18/30 P. O.

PLACED WITH Aluminum Company of America

BUYER

MATERIAL

Aluminum Sheets and Angles for Switch Cell Structure.
Brownsville Power House

Dates	Labor	I. C. P.	Copper	Aluminum		
12/ 5/28	233	97.1	16	24.3		
2/18/30	237	93.4	18	24.3		

REASONS FOR SO PLACING ORDER:

Only one source available. Substitution of material at a saving of $2,013.65 (37.7 %).

Vendor	Date	Delivery	F.O.B.	Quotation total	Freight	Net total
Aluminum Company of America	2/18/30	3 weeks	Shipping point	$3,844.80	$74.25	$3,919.05
Comparison with previous price on copper:						
National Brass Company	12/5/28			$5,400.17		

Approximate weight (pounds)	Material	Price (cents per pound)	Total	
12,600	¼-inch aluminum plate	27.8	$3,502.80	
900	¼-inch aluminum angle	38.0	342.00	$3,844.80
20,117	⅛-inch copper plate	23.58	$4,743.65	
2,750	⅛-inch bronze angle	23.875	656.52	$5,400.17
	Plus inward price (market change) 2 cents increase			458.28*
				$5,858.45

* The 2 cents per pound which made up this amount, if added to the price of copper and bronze, would raise their cost to 25.58 cents and 25.875 cents, respectively.

EXHIBIT 1.—Siskiyou Power Company. Quotation summary sheet covering purchase order.

QUOTATION SUMMARY SHEET

DATE 3/24/30 P. O.

MATERIAL

Aluminum Plates for Switch Cell Structure. Frisbie Substations

PLACED WITH Aluminum Company of America

BUYER

Dates	Labor	I. C. P.	Copper	Aluminum		
3/24/30	238	90.9	18	24.30		

REASONS FOR SO PLACING ORDER:

No other source available. Substitution of material at a saving of $12,924.48 (55.4 %).

Vendor	Date	Delivery	F.O.B.	Quotation total	Freight	Net total
Aluminum Company of America	3/24/30			$10,392.00		$10,392.00

Comparison with copper:

Approximate weight (pounds)	Material	Price (cents per pound)	Total	
34,000	¼-inch aluminum plate	27.3	$ 9,282.00	
3,000	¼-inch aluminum angle	37.0	1,110.00	$10,392.00
81,600	⅛-inch copper plate	25.53	$20,832.48	
9,600	⅛-inch bronze angle	25.875	2,484.00	$23,316.48

EXHIBIT 2.—Siskiyou Power Company. Quotation summary sheet covering purchase order.

Exhibits 1 and 2 illustrate the actual saving effected through the substitution of aluminum for copper. Exhibit 1 represents the initial purchase, and Exhibit 2, a second transaction.

In May, 1930, the company was again confronted with the problem of choosing between aluminum and copper, this time for the purpose of constructing a bus structure. By the thirteenth of the month copper, which had previously dropped to 12 cents, apparently had become temporarily fixed at 13 cents per pound. This represented a decline of approximately 30% from the March price, or the equivalent of the saving effected through the substitution of aluminum. Since the engineering department would accept either of the two metals, selection rested entirely with the purchasing department.

EXHIBIT 3
SISKIYOU POWER COMPANY
Comparative Costs of Aluminum and Copper as Computed by Metal Buyer

Current Quotation, May 16, 1930

Item	Aluminum			Copper		
	Price	Weight (pounds)	Cost	Price	Weight (pounds)	Cost
Plate 2 S. H.	$0.273	33,372	$ 9,110 56	$0.2053	53,395	$10,961.99
Molding 2 S.	0.365	4,860	1,773.90	0.208	15,552	3,234.82
Molding 51 st	0.440	972	427 68	0.208	3,110	646.88
Total			$11,312.14			$14,843.69

	Present cost	Estimated scrap		
Copper	$14,843.69	$7,446.77	Copper	$0.115 per pound
			Bronze	0.07 per pound
Aluminum	11,312.14	5,488.56	Aluminum	0 14 per pound
Difference	$ 3,531.55	$1,958.21		

Apparent net difference in favor of aluminum: $1,573.34.

Exceptions.—Scrap values are uncertain, and present value of sum to be secured from scrap is very small (about $1,000 in the above case, figuring 10 years at 6 %).

The new tariff reduces the duty on aluminum 1 cent per pound; this reduction will probably be reflected in prices within the next year.

Recommendation.—Although aluminum still shows us a saving at the present price of copper, the saving is small. I believe that we should try to secure a reduction of 1 cent per pound from the Aluminum Company in anticipation of reduced prices.

NOTES: Previous prices on aluminum same as the quotation. Saving on previous purchases of aluminum during the current year: $18,782.93.

Before receiving actual quotations from suppliers, the metal buyer estimated, on the basis of current prices, the probable cost of each metal and its probable scrap value in 10 years. These estimates were incorporated in a report, shown in Exhibit 3, which the buyer submitted to the general purchasing officer. In this report the scrap value of aluminum 10 years hence was set at 14 cents per pound. The buyer discounted this estimate, however, for several reasons. In the first place, aluminum scrap had not yet become sufficiently plentiful to affect the market price noticeably. It was not probable, however, in view of the increasing number of uses for aluminum, that such a situation would continue long. Other factors which the buyer took into consideration were a proposed 2-cent tariff reduction on imported aluminum, the advent of foreign competition to challenge the monopoly held by the Aluminum Company of America, and a

EXHIBIT 4

SISKIYOU POWER COMPANY

Recommended Aluminum Price, Based on Past Experience

	Current Quotation May 19, 1930
Cost of copper	$16,249
Cost of aluminum	11,312
Difference	$ 4,937
Present per cent gross saving	30%
Last P. O. (March 24, 1930) per cent gross saving	55%
Previous P. O. (February 18, 1930) per cent gross saving	37%

Price necessary to give equivalent savings:

		Pound price		
	Total	Plate	Angles	
55%	$ 7,312.05	$0.175	$0.240	$0.300
37%	10,236.87	0.245	0.337	0.421
Price quoted	11,312.14	0.273	0.365	0.440

Aluminum ingot market	$0.243 per pound
Aluminum scrap market	0 140 per pound (Cleveland)

Discussion.—The saving of 55% shown above was due to peculiar conditions not applying to this order. The 37% is strictly comparable.

The actual quotation from National Brass is higher than anticipated by $1,400. This nearly doubles the prospective saving from aluminum.

The market differential of aluminum to copper ingot was (March, 1930) 24.3/18.0 or 1.35. It is now 24.3/13.0 or 1.87. To maintain the same relation, aluminum ingots would have to drop to 17.42 cents, a reduction of 6.9 cents. With the normal 3 cents differential the sheet price would be 20.42 cents.

Recommendation.—It is my opinion that we should ask for a price between 20.3 cents and 24.3 cents (7 cents and 3 cents reduction, respectively). With a prospective tariff reduction of 2 cents (on ingots) and a recent reduction of approximately 5% (1¼ cents) in the European prices, 3¼ cents is a clear minimum.

The maximum reduction will be determined by general conditions. In 1914 and again in 1922 aluminum reached a price of 17 cents (sheets, 20 cents). It would appear, therefore, that we may safely ask for a new price to us of 20.3 cents per pound, delivered, although I consider it very improbable that the Aluminum Company will permit the market to break that price. I would rather expect the decline to come in two or three steps and over a period of six or more months, if the unfavorable conditions continue for that period.

probable price reduction by the latter company as a means of expanding its foreign and domestic market. Lower aluminum prices and therefore lower scrap values were to be expected in the future. On the other hand, the more mature copper market had already been adjusted to absorb a continuous flow of scrap copper. Except for the possibility of a more economical extraction and production process, copper prices over a period of years should not drop below 14 or 15 cents. For these reasons the buyer qualified as "apparent" the net difference in favor of aluminum shown by his report.

EXHIBIT 5
SISKIYOU POWER COMPANY
Comparative Costs of Aluminum and Copper, Based on Actual Quotations

Current Quotation, May 21, 1930

Item	Aluminum			Copper		
	Price	Weight (pounds)	Cost	Price	Weight (pounds)	Cost
Plate 2 S. H.	$0 273	33,372	$ 9,110.50	$0 2108	38,229	$ 8,058 67
				0.2075	17,958	3,726 29
				0.1613	889	143.40
				0 1858	66	12.26
				0.1825	73	13.32
Molding, bronze				0.2100	20,455	4,295.55
Molding 2 S.	0 365	4,860	1,773.90			
Molding 51 st.	0 440	972	427.68			
Total			$11,312.14			$16,249 49

	Present cost	Estimated scrap		
Copper	$16,249.49	$8,011 58	Bronze Copper	$0 07 per pound 0.115 per pound
Aluminum	11,312.14	5,488 56	Aluminum	0.14 per pound
Difference	$ 4,937.35	$2,523.02		

Apparent net difference in favor of aluminum: $2,414.33.

Exceptions.—The new tariff reduces the duty on aluminum sheets 1 cent per pound; this reduction will probably be reflected in prices within the next year.

Recommendation.—Although aluminum still shows us a saving at the present price of copper, the saving is small. I believe that we should try to secure a reduction of 1 cent per pound from the Aluminum Company in anticipation of reduced prices.

NOTES: Previous prices on aluminum same as this quotation. Saving on previous purchase of aluminum during the current year, $18,782.93.

After reading the metal buyer's report, the general purchasing officer suggested a report which would indicate, in the light of past experiences and present market conditions, what price the company should pay for aluminum. The report, shown in Exhibit 4, was devised to conform with his suggestion.

The general purchasing officer accepted the buyer's recommendation regarding a request for a lower price on aluminum. To determine what concessions were justifiable, a final estimate, as shown in Exhibit 5, was prepared on the basis of actual quotations.

As in the buyer's preliminary report, the net difference in favor of aluminum was discounted because of the doubtful future value of its scrap. Interest on the original investment, however, was a factor in favor of aluminum and tended to offset any reasonable reduction in the future price of aluminum. Despite these facts the general purchasing officer believed that, based on the present scale of prices, the actual saving to the Siskiyou Power Company would not be more than $1,000. This amount, in his opinion, would not offset certain intangible advantages in the use of copper. For instance, copper producers were more subject to market pressure and collectively had less control over the copper market than the Aluminum Company of America had individually over the aluminum market.

The Siskiyou Power Company did not practice price haggling in any form; it was the company's policy to state its opinion regarding prices, but never to ask for unreasonable concessions. If a supplier did not meet what the company believed to be a fair price, the matter was dropped, and the order was placed elsewhere. In this case the general purchasing officer, acting upon the metal buyer's recommendation, proposed to the Aluminum Company that it lower its price. The Aluminum Company, recognizing the fairness of the company's proposal, reduced its price 2 cents per pound. As a result the Siskiyou Power Company decided to purchase aluminum rather than copper.

24. SONIDE LIGHT & POWER COMPANY

INSPECTION—ORGANIZATION AND PROCEDURE

The inspection division of the Sonide Light & Power Company had been a part of the purchasing department for a number of years. In 1930 the purchasing officer of the company decided to review the method of inspection in order to determine whether or not the service performed by the inspection division was properly a function of the purchasing department.

The Sonide Light & Power Company furnished light and power and central-heating facilities to a community of 2,000,000 people. The operations of the company were administered by five departments, each of which performed one of the major functions: engineering, auditing, sales, stores, and purchasing. Each department was responsible to the president and to the vice president, who was also the general manager.

The purchasing function of the company had been developed to a high degree of efficiency as a result of constant study and analysis of the conditions and experiences of the department. The company constructed all its plants and, in years when it had an active building program, purchases amounted to over $30,000,000.

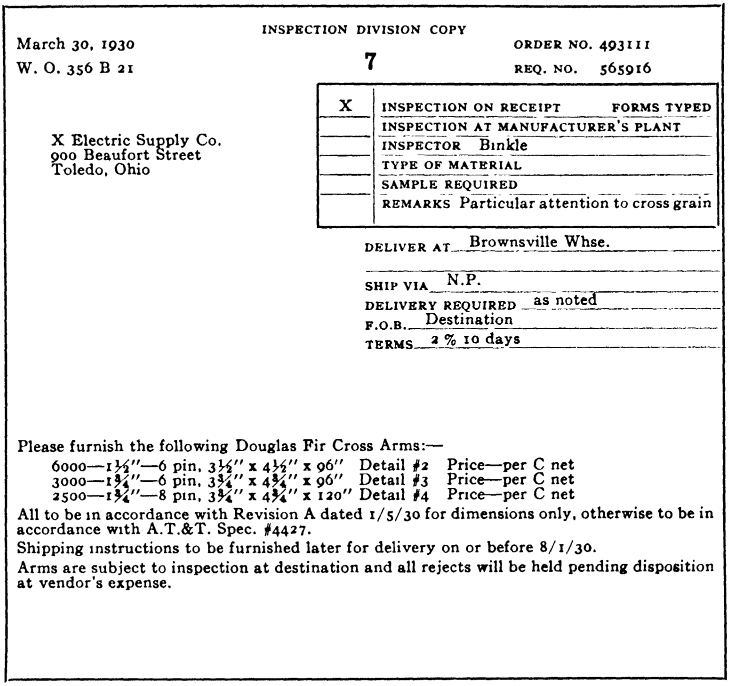
All buying was done on specifications, and strict inspection was made to insure that quality, workmanship, and performance conformed to the requirements of the specifications. The inspection division was a part of the purchasing department because the executives of the company believed that the two functions were interdependent. In fact they believed that it was a distinct help to the buyers to be kept informed about the technical details of the products which they purchased, by a man who was technically trained and yet commercially minded. When materials were defective and had to be returned to the supplier, it was thought that quicker action was obtained if inspection was a function of the purchasing department. The executives believed, furthermore, that close contact with the inspection division kept the buyers aware of the significance of quality in relation to that of cost. Also this contact assisted the purchasing department in opening up new sources of supply, since inspectors investigated plants and products of potential suppliers as well as those of established suppliers. In some instances inspectors had been able to call suppliers' attention to imperfect methods of production. In other instances inspectors had assisted suppliers to fulfill contracts and speed deliveries.

The inspection division was in charge of an inspection engineer, who determined inspection policies, kept all specifications in his custody, and acted as the coordinating agency between the various departments when new specifications were compiled or old ones revised either by the inspection division itself or by the using department. Eight inspectors, each specializing in a group of related commodities, performed the work assigned to the division. A minor part of the company's inspection work was for items requiring facilities not possessed by the company, and in such instances outside testing agencies performed the inspection.

The function of the division was divided into three closely related groups: supervision of the formulation of adequate specifications for purchases, routine inspection of material purchased, and material studies in which specific application was made of information gained through inspection. These duties were performed either at the request of any department in the company or upon the initiative of the division itself. Specific attention was given to each of these three phases of the division's work.

Inspection of material or equipment was made either upon the request of requisitioning departments, using departments, buyers, or any other interested parties, or upon the initiative of the inspection division. In most instances the requests became standing assignments, and as a result over half the company's purchases were inspected regularly. The remaining purchases were inspected periodically as a check, but in most instances such items either came from manufacturers of unquestionable integrity or for other reasons did not require inspection.

The procedure for inspection was as follows: The seventh copy of all purchase orders, the form of which is shown as Exhibit 1, was delivered to the inspection division daily. The inspection engineer segregated the orders to be inspected and had an inspection form, shown in Exhibit 2, prepared for each order. This report of inspection was filled out in quadruplicate, and in addition to the name of the supplier and the requisitioner it contained a description of the material, the quantity, and the governing specification. The original was held by the inspection department until inspection was completed, at which time the form was filled out and sent to the requisitioning department. The duplicate was used as the inspector's field copy. The triplicate was mailed to the requisitioning department as a notice that inspection would be made. The quadruplicate was mailed to the point of delivery, to be returned to the inspection division when the material was received.



INSPECTION DIVISION COPY

March 30, 1930
W. O. 356 B 21

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ORDER NO. 493111
REQ. NO. 565916

X	INSPECTION ON RECEIPT FORMS TYPED
	INSPECTION AT MANUFACTURER'S PLANT
	INSPECTOR Binkle
	TYPE OF MATERIAL
	SAMPLE REQUIRED
	REMARKS Particular attention to cross grain

X Electric Supply Co.
900 Beaufort Street
Toledo, Ohio

DELIVER AT Brownsville Whse.
SHIP VIA N.P.
DELIVERY REQUIRED as noted
F.O.B. Destination
TERMS 2 % 10 days

Please furnish the following Douglas Fir Cross Arms:—
6000—1½″—6 pin, 3½″ x 4½″ x 96″ Detail #2 Price—per C net
3000—1¾″—6 pin, 3¾″ x 4¾″ x 96″ Detail #3 Price—per C net
2500—1¾″—8 pin, 3¾″ x 4¾″ x 120″ Detail #4 Price—per C net

All to be in accordance with Revision A dated 1/5/30 for dimensions only, otherwise to be in accordance with A.T.&T. Spec. #4427.

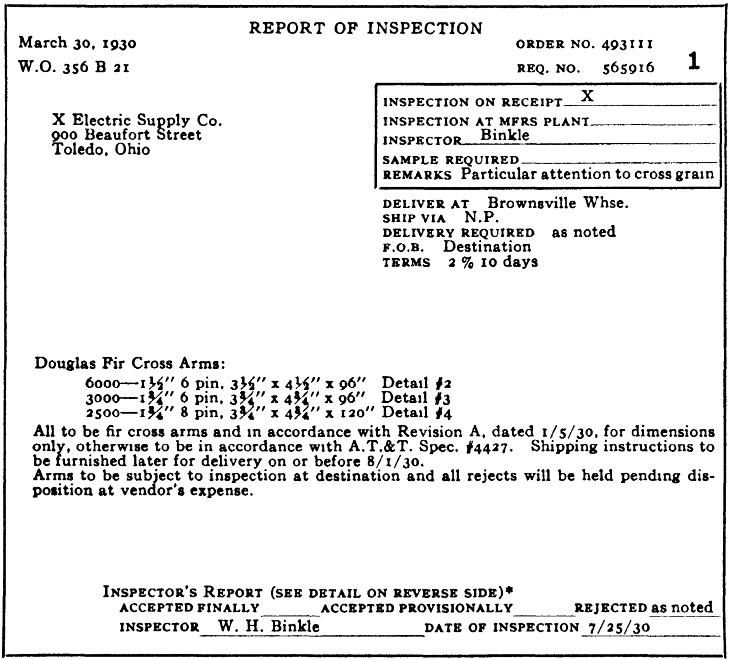
Shipping instructions to be furnished later for delivery on or before 8/1/30.

Arms are subject to inspection at destination and all rejects will be held pending disposition at vendor's expense.

EXHIBIT 1.—Sonide Light & Power Company. Inspection division copy of the purchase order.

When materials were found unsatisfactory at the time of inspection, a report of rejection, shown in Exhibit 3, was issued in quadruplicate. The original was sent to the purchasing officer and then forwarded in succession to the buyer, the invoice checking division, and the purchasing department's completed files.

The duplicate was sent to the requisitioning department to notify it of action taken. The triplicate was filed in the inspection division's files for reference purposes, and the quadruplicate was given to the inspector for his follow-up. The inspector making out the report included any information he could obtain as to what disposition the using department wished to have made of the material.



REPORT OF INSPECTION

March 30, 1930
W.O. 356 B 21

ORDER NO. 493111
REQ. NO. 565916 1

X Electric Supply Co.
900 Beaufort Street
Toledo, Ohio

INSPECTION ON RECEIPT X
INSPECTION AT MFRS PLANT
INSPECTOR Binkle
SAMPLE REQUIRED
REMARKS Particular attention to cross grain

DELIVER AT Brownsville Whse.
SHIP VIA N.P.
DELIVERY REQUIRED as noted
F.O.B. Destination
TERMS 2 % 10 days

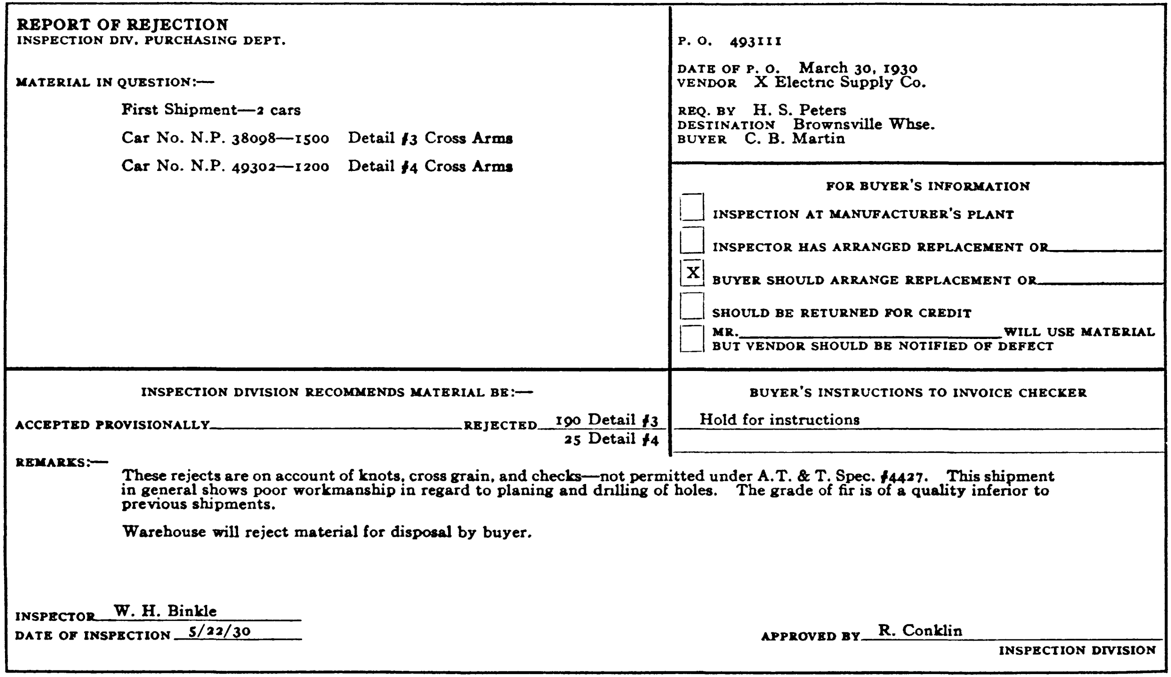
Douglas Fir Cross Arms:
6000—1½" 6 pin, 3½" x 4½" x 96" Detail #2
3000—1¾" 6 pin, 3¾" x 4¾" x 96" Detail #3
2500—1¾" 8 pin, 3¾" x 4¾" x 120" Detail #4
All to be fir cross arms and in accordance with Revision A, dated 1/5/30, for dimensions only, otherwise to be in accordance with A.T.&T. Spec. #4427. Shipping instructions to be furnished later for delivery on or before 8/1/30.
Arms to be subject to inspection at destination and all rejects will be held pending disposition at vendor's expense.

INSPECTOR'S REPORT (SEE DETAIL ON REVERSE SIDE)*
ACCEPTED FINALLY ACCEPTED PROVISIONALLY REJECTED as noted
INSPECTOR W. H. Binkle DATE OF INSPECTION 7/25/30

* Statement appearing on reverse of form:
"Order complete and rejected material returned to vendor. See rejection reports dated 5/22/30 [see Exhibit 3], 6/15/30, 7/20/30."

EXHIBIT 2.—Sonide Light & Power Company. Report of inspection.

In order to have adequate inspection, it was considered necessary to have adequate specifications. Because of this close relationship the inspection division was custodian of all specifications and was responsible for obtaining approval of new or revised specifications. Regardless of whether a using department or the inspection division revised or compiled a specification, it did not become active until the signatures of all interested depart-



REPORT OF REJECTION
INSPECTION DIV. PURCHASING DEPT.

MATERIAL IN QUESTION:—

First Shipment—2 cars
Car No. N.P. 38098—1500 Detail #3 Cross Arms
Car No. N.P. 49302—1200 Detail #4 Cross Arms

P. O. 493111

DATE OF P. O. March 30, 1930
VENDOR X Electric Supply Co.

REQ. BY H. S. Peters
DESTINATION Brownsville Whse.
BUYER C. B. Martin

FOR BUYER'S INFORMATION

☐ INSPECTION AT MANUFACTURER'S PLANT
☐ INSPECTOR HAS ARRANGED REPLACEMENT OR
☒ BUYER SHOULD ARRANGE REPLACEMENT OR
☐ SHOULD BE RETURNED FOR CREDIT
☐ MR.________ WILL USE MATERIAL BUT VENDOR SHOULD BE NOTIFIED OF DEFECT

INSPECTION DIVISION RECOMMENDS MATERIAL BE:—

ACCEPTED PROVISIONALLY________ REJECTED 190 Detail #3
25 Detail #4

BUYER'S INSTRUCTIONS TO INVOICE CHECKER

Hold for instructions

REMARKS:—

These rejects are on account of knots, cross grain, and checks—not permitted under A.T. & T. Spec. #4427. This shipment in general shows poor workmanship in regard to planing and drilling of holes. The grade of fir is of a quality inferior to previous shipments.

Warehouse will reject material for disposal by buyer.

INSPECTOR W. H. Binkle
DATE OF INSPECTION 5/22/30

APPROVED BY R. Conklin
INSPECTION DIVISION

EXHIBIT 3.—Sonide Light & Power Company. Report of rejection.

ment heads and the buyer for the material concerned were affixed to it. A card was kept for each specification showing its status at all times.

New specifications or revisions of old specifications were written whenever the need became apparent to the inspection division or a request to do so was received from an interested party. To aid it in writing specifications, the inspection division maintained files of all nationally recognized specifications, including those of the United States Government, United States Navy, National Electric Light Association, American Standards Association, General Motors Corporation, and American Telephone and Telegraph Company. In general, specifications were based upon some national standards and modified as necessary to meet the company's needs. Where there were no national specifications covering the material desired, original specifications were prepared based on material which had proved satisfactory in use. Tests, analyses and visual inspection were incorporated into the specifications in order to insure obtaining the exact material required.

With its inspectors working continually with the properties of materials and in regular contact with manufacturing plants throughout the country, the inspection division was in a position to obtain valuable information about improved products and new sources of supply. All plant inspections to determine a supplier's capacity and facilities for manufacturing the materials required by the company were made by the inspection division. Records of such inspections included reports on the manufacturer's equipment, type of buildings, output, capacity, products, personnel, and any other pertinent information.

From time to time the inspection division undertook material studies in order to determine if other materials would be more suitable than those being used. Substitution of standard specification material for trade-marked material was often possible and permitted substantial savings. New products presented to the buyers by salesmen usually were turned over to the inspection division to be studied and reported upon in conjunction with the research department.

In reviewing the company's method of inspection to see if it could be performed more efficiently by some other department of the company, the purchasing officer also investigated the manner in which other companies performed the inspection service. He considered first the method used by the Charles River Power Company, which was approximately the same size as the Sonide Light & Power Company.

The Charles River Power Company was organized on a functional basis similar to that of the Sonide Light & Power Company. The six major functions were sales, engineering, operation and maintenance, auditing, purchasing, and stores. The inspection division was a part of the stores department.

The stores department was expected to maintain a continuous supply of material required by the company. The duties involved in furnishing needed materials were allocated by the management as follows: A stock control committee, having a personnel representing engineering and new construction, operation and maintenance, and stores, decided all financial policies affecting stores. The decision as to the quantity and the quality of materials was left to the department responsible for the completed work; on this basis the stores department set its inventory control standards and determined the proper specifications. The purchasing department made all vendor contracts for the purchase of materials and equipment. The standardizing and testing division of the engineering department performed the laboratory service for the stores department by testing materials to see that they conformed to specifications.

All inspection of materials and equipment was done under the jurisdiction of the inspection division of the stores department. This division was composed of six inspectors and was in charge of a chief inspector who reported to the assistant superintendent of the stores department. All inspectors were familiar in part with all the duties of the division, but in practice they specialized in related groups of commodities.

The duties of the inspection division were many and varied. One of the most important was the compilation of purchase specifications. In order to have proper inspection it was necessary to establish standards and grades to which the materials purchased could be required to conform. No attempt was made by the division to express engineering judgment or selection, as that was a duty of the using department, in cooperation with both the engineering department and the standardizing and testing department. The inspection division served chiefly as a clearing house for the information required to compile specifications that could be understood commercially.

In connection with this work the inspection division prepared forms known as warrants, which were required for all materials that were to be carried continuously in stock. The department which used the material submitted a memorandum to the stores department authorizing that the item be carried in stock. After being approved by the stock control committee, this request was referred to the inspection division, which prepared a warrant to cover the item authorized in the memorandum. The warrant assembled all the pertinent information needed to furnish a complete and concise ordering specification for the permanent purchase requisition.

This permanent purchase requisition was prepared by the inspection division and served as a requisition for 15 consecutive purchases. In addition to the specifications, it contained all necessary instructions for typing the purchase order. Purchase orders made from this requisition were typed in the stores department and forwarded to the purchasing department. The permanent purchase requisition was kept on file in the stores department. The inspection division also compiled specifications for items which were not purchased regularly.

Another duty of the inspection division was to act on all proposals from vendors to substitute items for those which had been ordered on purchase orders originating in the stores department. The inspectors were familiar with the properties required in the items and thus were in a position to determine whether a substitute product would meet the necessary requirements.

All materials handled by the stores department received some type of examination, inspection, or testing. While the inspection division performed most of these duties, the company's standardizing and testing division and outside commercial laboratories were called upon when the inspection division did not have the required facilities. The place of inspection varied according to the type of product. In some instances it was more satisfactory to inspect at the supplier's factory during process and before shipment; in others, at the time the material was delivered to the job. Most of the inspection, however, was performed at the company's storehouse and pole yards. All materials received by the company had to have an inspector's approval before being released for stock or use. This approval was recorded on the receiving report.

In general the various types of inspection were as follows:

1. Regular laboratory tests. Examples: cable, meters, coal.
2. Occasional laboratory tests. Examples: friction and rubber tape, flashlight batteries, metal polish.
3. Complete examination of each article. Examples: manhole castings, cross arms, materials with poor quality record.
4. Complete examination of part of each lot. Examples: hardware, stationery, parts, and a variety of materials with good quality record.
5. Checking by markings. Examples: soap and other packaged material of standard brands with an excellent quality record.

An analysis made of a large number of receiving reports to find out in what proportion different types of inspection were used produced the following results:

	Per Cent
Regular laboratory tests	9
Occasional laboratory tests	5
Complete examination of each article	2
Complete examination of part of each lot	59
Checking by markings	25

A duty quite apart from the actual routine inspection was that of investigating claims and errors arising in connection with the purchase of materials. The inspection division investigated all invoice and receiving record discrepancies. In cases which justified claims, the inspection division ordinarily met vendors' representatives to discuss shortages or errors. Such difficulties usually were adjusted in this manner without the necessity of formal action. The inspection division also collected evidence for the transportation department on cases involving transportation claims. Complaints concerning material issued from stores which was not adaptable to the needs of the using department were referred to the inspection division for investigation.

All materials returned to stores or salvaged within the company were inspected by the inspection division. On standard stock items, investigation was made to determine if the material was suitable for re-issue. If repairs were necessary, it was the duty of the inspector to estimate the costs for the accounting records. All salvaged materials were inspected in order to verify trade classification of the scrapping. In such a material as cable, which was sold for the value of its component metals, the amounts of the metals were determined by analysis in the inspection division. The proper disposition of obsolete or semiobsolete items was decided by the inspection division in conjunction with the using departments.

The executives of the Charles River Power Company believed that the inspection division belonged logically in the stores department, as it performed an essential part in carrying out that department's function of maintaining a continuous supply of material which met the requirements of the company. They believed, furthermore, that having inspection in the stores rather than in the purchasing department made it possible to exert a greater check on the purchasing department and thus to insure that price was not the prime consideration in the purchase of materials.

The purchasing officer of the Sonide Light & Power Company next investigated the method of inspection used by the Follin Motor Products Company, a large manufacturer of automobile parts. This company recognized finance, sales, and production as its major functions. The problems of the company were chiefly those of production, as the manufacturing facilities had to be adapted to meet the needs of the automobile manufacturers who purchased the parts. The purchasing officer reported to the assistant general manager, who was in charge of manufacturing operations. The stores division was under the control of the production department. The inspection service was a department by itself and was headed by a chief inspector, who reported to the general manager. Twenty-five inspectors and one clerk performed the duties of the department. Specifications for all materials were compiled by the engineering department, which, however, sought the advice of the inspection department in order to benefit from its experiences.

The inspection department was responsible for the inspection of all incoming materials, materials in the process of manufacture by the company, and finished products. A majority of the inspectors worked on materials in process of manufacture. The same inspectors who examined the company's finished products performed most of the inspection on incoming materials. All incoming materials had to be inspected before being released to the stockroom. The purchasing department notified the inspection department when materials were scheduled for delivery, and the receiving room notified the chief inspector upon actual receipt of the material at the plant. Only on special occasions were inspectors sent to a supplier's plant to inspect the material before shipment.

The various methods of inspection used were laboratory tests, complete examination of each article, and sampling. Outside laboratories were used when additional testing facilities were required. Whenever material did not comply with the specifications, the inspection department forwarded a report to the purchasing department and the production manager, showing wherein the material failed to meet the specification and stating whether the material could be used for another purpose.

The executives of the Follin Motor Products Company believed that inspection was neither a production nor a purchase function and that it should therefore be a separate department reporting to one of the chief executives. They argued that only in this way could there be absolutely impartial inspection and thus assurance of quality. They pointed out that quality and precision were necessary in their business to insure success. Unless incoming materials were of proper quality, productive processes might be seriously interrupted, as inferior materials could not be properly processed on the high-speed equipment necessary to produce large quantities of all types of parts at minimum cost. Furthermore, since the parts which the company made for automobile manufacturers had to be made precisely enough to be interchangeable in assembly work, rigid inspection was necessary to insure this high degree of accuracy. Inspectors working under the purchasing department might be tempted to pass inferior materials in order to cover careless or price buying. On the other hand, inspectors working under the production department might pass inferior completed parts in order to show smaller production losses due to spoiled parts.

25. CAPWELL COMPANY

TYPES OF INSPECTION OF MATERIALS

The wide range in grades of materials used by the Capwell Company in its products, and the necessity, in many instances, of knowing the constitution and properties of the materials, required decisions not only on the type of tests to be applied but also on the extent to which the tests should be made currently. The most important materials were large steel shaft stock, a special grade of paper, wire, and materials for compounds.

The company owned an extensively equipped testing laboratory and employed a highly trained staff of engineers to control the tests required by the technical nature of its products. In view of the large volume of manufacture the work of the testing staff was limited to essential tests and investigations. It was uneconomical to go into too fine details or to fail to perform tests as early as possible in the manufacturing cycle. The sooner a test was made after materials had arrived, the less chance there was for unnecessary transportation and useless work on defective materials. There was, therefore, a question of whether or not the Capwell Company should accept the tests and inspections of the manufacturers furnishing the materials.

In placing an order for materials on the basis of samples submitted, the Capwell Company, after determining that the firm from which it was buying the material could maintain production within the desired specifications, had the further question of how often tests should be made to check the performance. The certificate of the vendor might be accepted for each shipment or portion thereof; or the testing staff might test each shipment or portion thereof, take periodic samples of shipments, or rely on visual and manual inspection in its receiving department and shops.

Of the four materials cited, steel shaft stock required the highest degree of technical knowledge in its production and testing. Because of their advances in metallurgy during recent years, the producers were able to make the required tests. In some instances, it was desirable to know not only the chemistry of the steel but also the structural or mechanical variations. These factors were dependent upon the original "melt" and upon subsequent "heat charges." A shipment of stock to the Capwell Company might contain steel of several different melts and heat charges.

The specifications for compound material allowed reasonable limits in composition. In each shipment, which was uniform throughout, it was necessary to know not only that the material was within the limits but also its exact specifications within these limits, so that the quantity of other materials to be mixed with it could be proportioned correctly.

For one type of wire purchased by the Capwell Company, the specifications required an exceptionally high elastic limit. The manufacturer shipped the wire in coils and had insufficient means for testing it properly for elasticity. Furthermore, the testers of the Capwell Company had no assurance that all the wire in a shipment had been drawn in the same lot, or that it was uniform throughout.

The special grade of paper used by the Capwell Company required a specified degree of toughness. Anyone handling the paper continually could easily determine whether it had the required degree of toughness by bending and tearing it. A more scientific method was to place samples in a machine and determine the force necessary to tear or cut them. For years, the paper had been purchased from an old, established manufacturer, orders being placed less by exact specification than in the spirit of "another shipment like the last one." As long as the manufacturer maintained the grade of the paper, the officials of the Capwell Company were satisfied.

The Capwell Company accepted the manufacturers' certificates of tests on large shaft stock. A certificate was required for steel from each melt and heat charge in a shipment. Thus, if a shipment was composed of three lots of steel or melts, there would be three certificates to cover them. Similarly, if each melt had been split into different heat charges, a certificate of tests on each of the latter was required.

Compound materials were sampled by the testers of the Capwell Company upon arrival of shipments. The wire was tested by having two samples per roll sent to the Capwell Company and approved before shipment was permitted. Testing of the paper was left to the men handling it continually in the shops.

SECTION IV

QUANTITY CONTROL

26. ENDLICH MACHINE COMPANY

COORDINATION OF PURCHASING WITH INVENTORY CONTROL

Early in 1932 the executives of the Endlich Machine Company were considering the problem of coordinating the control of inventory and the purchasing of the company. The decline in prices had made it essential to keep inventories at the lowest possible point. Moreover, the increased speed of deliveries made it less imperative than formerly that the company keep large quantities of material in stock. In order that the company might avoid heavy inventory losses and might best profit from the advantages of quick delivery, the executives wished to make sure that the inventory control was closely linked to purchasing.

The Endlich Machine Company was a large manufacturer of machine tools. The company had an unusually extensive line of cutters, fixtures, and attachments. It regularly made and stocked all its machines as well as its large line of supplementary parts. In a good year the sales of the company ran close to $9,000,000, at which rate of operation it required purchases of almost $2,000 000 to supply the plant with fuel, materials, and miscellaneous supplies. The company kept a stock of raw materials and unassembled parts amounting to almost $1,500,000. In 1930 the stocks of finished machines and accessory equipment also ran as high as $1,500,000.

All the manufacturing operations of the company were centralized at its plant in Cincinnati. These operations were varied in character. The company had a foundry which supplied part of its requirements of castings for machines. It had large machine shops with flexible tools for the shaping of machine tool parts. The line of attachments made by the company required careful work and an unusual amount of skill because of the high degree of accuracy necessary in the machining of these parts. The company carried a large stock of parts, both for replacement on its machines and for assembly into new machines. As a rule, these parts were not made and assembled into machines at one time but were put into stock for assembly at some later date, when the stock of finished goods became low.

The director of inventories, who was an executive of the Endlich Machine Company, performed the duties of watching inventories and making out production and purchase orders when stocks of finished goods or raw materials were low. The purchasing officer, the storekeeper, and the director of inventories operated under the vice president in charge of production as shown in Exhibit 1.

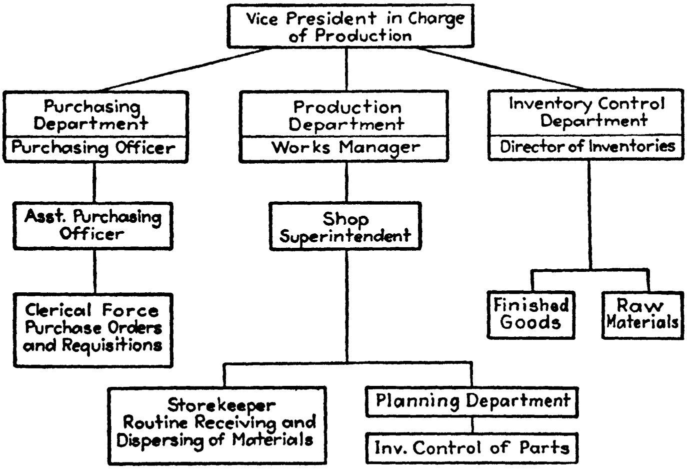


Exhibit 1.—Endlich Machine Company. Production organization.

This organization was the result of a process of development over the previous few years. In 1928 the executives of the company first realized that there was insufficient coordination among the various departments. Up to that time manufacturing had been divided into two departments, one for machines and one for tools and cutters. Finished goods were ordered by the sales department. Parts were fabricated on order from the planning department. Raw materials orders were authorized by the production departments. With the authority for ordering in so many different places, there was no coordination in the placing of orders for finished goods, parts, and raw materials. Orders for parts or materials often were placed without knowledge of changes in design or material contemplated by the sales department, with the result that, after such changes were made, the company had an excessive stock of obsolete parts and materials on hand.

The first step in the development of the new organization had been to combine the two production departments. Shortly after this change had been made, it was decided to create the position of director of inventories. The man in this position was to report to the vice president in charge of production and was to have control of the inventories of raw materials and finished goods. It was planned to put him in charge of the inventories of parts at a later date. The reason for this division of control was that the stocks of finished goods and raw materials had always been controlled by the men in charge of production, whereas parts had been left to the planning department. The executives of the company believed that in the beginning the director of inventories would be sufficiently occupied in the organization of his department and in the supervision of the inventories of finished goods and raw materials. After the director had had an opportunity to work out methods for the control of these stocks, the control of the parts inventory could be turned over to him. In 1932, however, the parts inventory was still being controlled by the planning department.

The problem that confronted the executives of the Endlich Machine Company was to make sure that the director of inventories used the facilities of the purchasing department to the best advantage and that the purchasing department advised the director of inventories of any exceptional bargains in materials which the company would need in the near future.

The purchasing department of the company consisted of a purchasing officer, one assistant, and a clerical force to handle purchase orders and requisitions. The following table illustrates the type of purchases made by the company in a fairly good year:

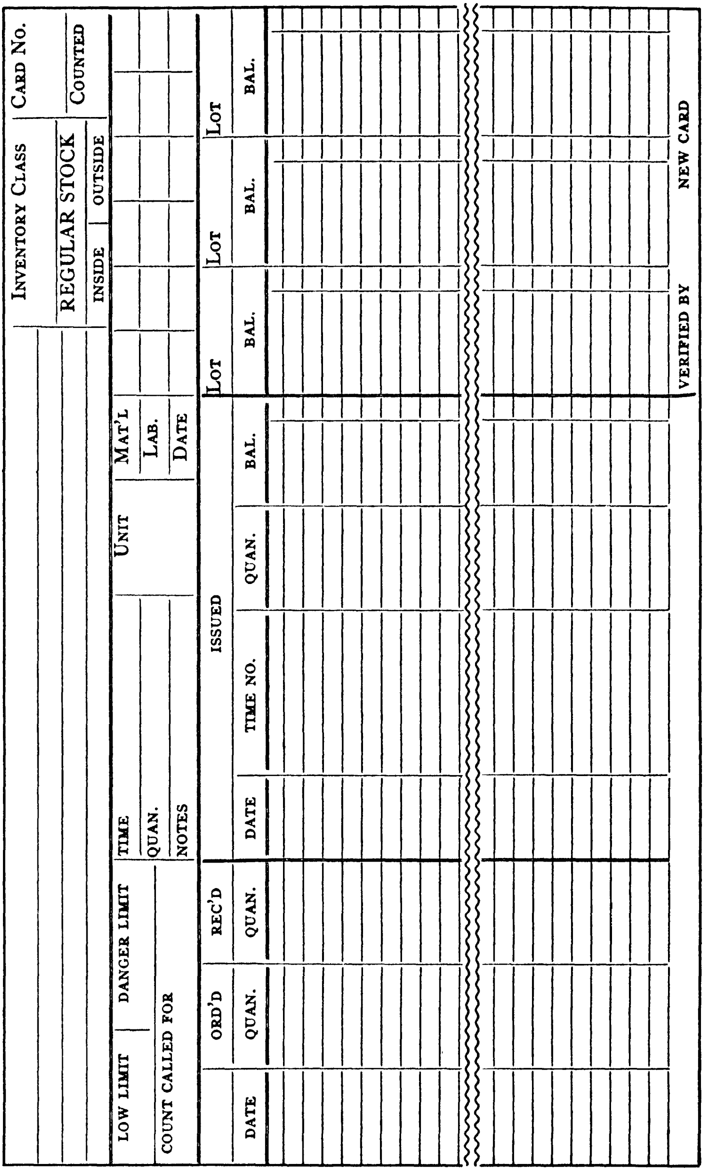
Low-carbon steel	$ 250,000
High-speed tool steel	150,000
Tool steel, other than high-speed steel	130,000
Pig iron	130,000
Castings and forgings	200,000
Lumber	45,000
Fuel	75,000
Foundry supplies	55,000
Miscellaneous	550,000
	$1,585,000

While the purchasing department had always tried to keep in close contact with the engineering department and the production department, in order to obtain the best possible materials and to keep down inventories, the purchasing officer could not originate any orders for material and had no power to force acceptance of a particular type of material.

Except for the inventory of parts, the control of inventory rested completely in the hands of the director of inventories. Although this executive reported to the vice president in charge of production, he kept in close contact with the sales department. He followed sales closely and tried to keep inventories in line with them. On the other hand, the storekeeper of the company, who reported to the shop superintendent, had charge only of receiving and distributing materials. He issued materials on requisitions and stored them on notice from the receiving department. His function was almost entirely clerical. He was not responsible for the size or the completeness of the inventories. While he might advise the director of inventories in case a shortage of some article appeared imminent, he could not send a requisition to the purchasing department for it. Under this plan the entire responsibility for inventories rested with the director of inventories.

When the director of inventories first took over his new duties he found that on the monthly reports the inventory of raw materials was divided into 12 classes, having a total of 60,000 items or an average of 5,000 items per class. It was impossible to use these reports as a check on inventories when items were buried in such all-inclusive figures. His first step was, therefore, to subdivide each class according to the type of material until there were over 200 subdivisions. Typical subdivisions were belts, bolts, etc. From a report containing these subdivisions, it was easier to follow the inventory in considerable detail and to find out just which items were increasing and which were decreasing.

There was a perpetual physical inventory card for each of the 60,000 items in the plant of the Endlich Machine Company. Exhibit 2 shows the card used for raw materials and parts, and Exhibit 3 the card used for finished goods. The files of these cards were kept in the factory accounting office. They covered raw materials, finished goods, and parts. Besides being kept in the office file, the parts inventory cards were kept on file in the shop



INVENTORY CLASS | CARD NO.

REGULAR STOCK

INSIDE | OUTSIDE | COUNTED

LOW LIMIT | DANGER LIMIT

COUNT CALLED FOR

TIME

QUAN.

NOTES

UNIT

MAT'L

LAB.

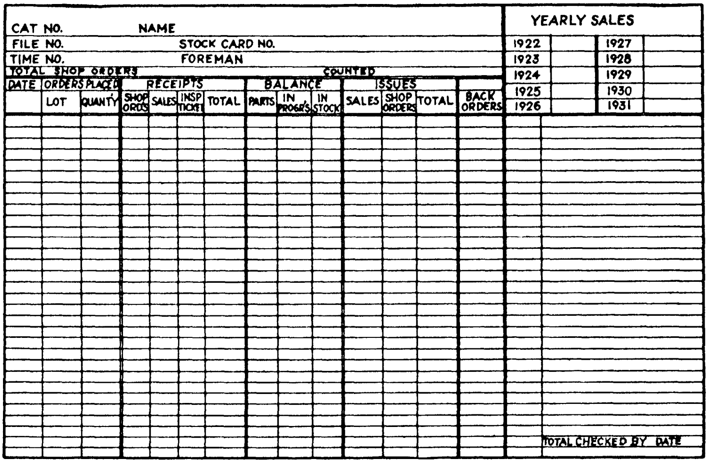
DATE

	ORD'D	REC'D	ISSUED				LOT	LOT	LOT
DATE	QUAN.	QUAN.	DATE	TIME NO.	QUAN.	BAL.	BAL.	BAL.	BAL.

VERIFIED BY | NEW CARD

EXHIBIT 2.—Endlich Machine Company. Perpetual physical inventory card for raw materials and parts.

for production purposes, since they contained specifications, lot sizes, and similar manufacturing data. If the director of inventories took over the control of parts, it was planned to have him combine these files. The expense of this change was one of the factors which, up to 1932, had prevented the company from making the shift.



CAT NO. NAME
FILE NO. STOCK CARD NO.
TIME NO. FOREMAN
TOTAL SHOP ORDERS COUNTED

DATE	ORDERS PLACED		RECEIPTS				BALANCE			ISSUES			
	LOT	QUANTY	SHOP ORDS	SALES	INSP TICKET	TOTAL	PARTS	IN PROGR'S	IN STOCK	SALES	SHOP ORDERS	TOTAL	BACK ORDERS

YEARLY SALES			
1922		1927	
1923		1928	
1924		1929	
1925		1930	
1926		1931	

TOTAL CHECKED BY DATE

EXHIBIT 3.—Endlich Machine Company. Perpetual physical inventory card for finished goods.

The Endlich Machine Company kept job records in its shop and sent reports of all materials issued from stores to the factory accounting office. Here all transactions were entered on the perpetual inventory cards. As a clerk entered an item, he flagged the card with a blue flag. The assistants of the director of inventories had a regular schedule for examining the perpetual inventory cards. They covered both the finished goods and raw materials files every week. In this examination of the inventory files they did not attempt to look at every card but checked only those on which a blue flag indicated that an entry had been made during the previous week. From these flagged cards they picked out all those items which they believed should be brought to the attention of the director of inventories. There were no definite maxima and minima in this selection; instead, the assistants were guided by their judgment as to the need for more stock as shown by past use. For raw materials, two months' supply was considered ample.

The cards which the assistants had picked out were taken to the director of inventories once a day. At that time he looked over the cards and made the final decision as to what articles should be ordered. From his knowledge of the sales of the company he could estimate future needs of raw materials more closely than could be done under a fixed system of maximum and minimum control.

The director of inventories tried to anticipate his requirements of finished goods by six months. In periods of good business most of these requirements were based on actual sales; in periods of declining business the production was largely for stock. In the case of important machines, the director of inventories would notify the production department that he expected to put through an order within the next few months. The production department would then consult the perpetual inventory cards to ascertain its current stock of parts. If the necessary stock of those parts which the company itself produced was not on hand, the production department, on authorization of the planning department, would make up enough to cover the anticipated order. If there was an insufficient stock of a part that was usually purchased rather than produced by the company, the production department notified the director of inventories. The director then either cut down the planned number of machines so that the purchase of additional parts was unnecessary or requisitioned the purchasing department for the necessary parts. In instances where the purchase of such parts would be too costly, as, for example, in the purchase of a single part ordinarily bought in quantity, the inventory director would choose the alternative of reducing the planned number of machines to be produced. By these means, when the director of inventories issued a shop production order for some finished machines, the parts would all be on hand for the prompt execution of the order.

In connection with the control of raw materials the director of inventories maintained a set of graphs which covered all the subdivisions of the inventory. On each graph the amount of the inventory was marked every month. Twice a year the turnover of that article was also figured and put on the graph. In order to have a working standard the director of inventories had set a standard turnover for each item. He had based this turnover on the consumption, time for delivery, size of order, production lot, and any special factors that might be pertinent. The standard turnover was put at the top of each graph. By this method the director of inventories had a picture of the condition of each subdivision in his inventory classification and could easily keep track of his inventories.

The director of inventories had done an excellent piece of work in controlling his stocks. He reduced the inventory of purchased goods by 30% between 1929 and 1932. The inventory of raw materials, which included labor expended upon the production of some parts, remained fairly constant. In contrast to most concerns the company's 1929 inventory had been extremely low. Like most manufacturers of machine tools, the Endlich Machine Company was swamped with orders in 1928 and 1929. Late in 1929 almost its entire stock of machines and parts had been sold. During 1930 the company built up its inventory slowly. In every previous business decline the inventory had gone up sharply as soon as sales had dropped off. In 1930 the director of inventories replenished his stock of necessary materials and parts but did not allow the inventories to go much beyond the 1929 level. The following table shows the stocks and turnover of all raw materials on December 31 of the years 1929–1931.

Year	Stocks	Turnover
1929	$1,373,240	5.7
1930	1,500,000	2.8
1931	1,243,978	

With the entire responsibility for inventories vested in one man, a number of changes had been made which kept down inventories and helped other departments. The director of inventories had been able to standardize on certain articles and certain sizes. He had, for instance, reduced the number of sizes of files and other small tools. This change had enabled him to reduce the quantity of those items which it was necessary to carry in stock.

Another change instituted by the director of inventories was the regrouping of the perpetual inventory cards in such a manner that the group examined each day was as nearly homogeneous, from the purchasing department's point of view, as possible. This practice had two distinct advantages for that department. In the first place, the purchasing officer could center his attention on one group of articles at a time and not have to consider steel sheets one minute and sheets of paper the next. This regrouping also had affected salesmen's calls to an appreciable degree. Local salesmen particularly had learned that the purchasing department bought, for example, its printing on Tuesdays and its bolts on Wednesdays. In such trades as paper and printing, where salesmen often called daily, this system had resulted in the elimination of many waste calls.

In studying the problem of obtaining the best possible coordination between inventory control and purchasing, the executives of the company considered several possibilities. Since both the purchasing officer and the director of inventories reported to the vice president in charge of production, he could be relied upon to coordinate the two departments. The main work of this vice president, however, was connected with the intricate problem of shop production, and he could not afford to spend a great deal of time checking inventories and purchases. Any system which placed chief reliance upon him for coordination was subject to the disadvantage that he did not have time to do the work thoroughly.

Another possibility was to leave the coordination entirely to the joint responsibility of the purchasing officer and the director of inventories. The two men had similar ideas about keeping down inventories and would probably work together without much direction. In order to make sure that the two departments were coordinating their efforts, a system of reports to the vice president might be devised which would show whether a close contact was being maintained between the two departments.

The final possibility was that either the purchasing officer might report to the director of inventories instead of directly to the vice president, or the director of inventories might report to the purchasing officer. Either method would assure the coordination of the two departments.

27. DITMAR RUBBER COMPANY

COORDINATION OF RAW MATERIALS INVENTORY WITH PRODUCTION

The Ditmar Rubber Company of Akron, Ohio, manufactured a complete line of rubber and canvas footwear which was sold under the well-known Ditmar brand. The company was an important element in the market and was considered a trade leader. For several years immediately preceding 1934 the style factor in rubber and canvas footwear had been of increasing importance, making it necessary for the company to exercise close control of both production and inventories. Little manufacturing was done for stock, production being scheduled for the most part on the basis of customers' orders actually on hand. The company followed a policy of forward buying when market conditions indicated that speculation would be profitable. After 1932 the effective control of raw materials inventory was particularly difficult because of the overstocked condition in many items of raw materials and the uncertainty of production schedules.

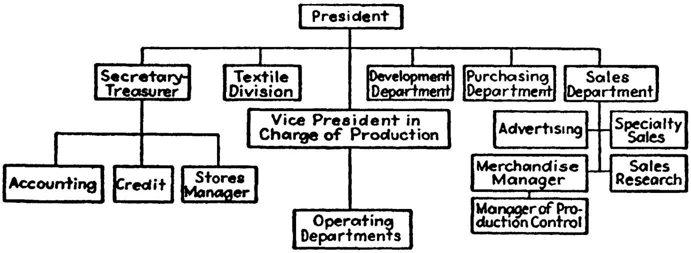


EXHIBIT 1.—Ditmar Rubber Company. Organization chart, 1934.

The stores manager of the Ditmar Rubber Company reported to the treasurer, as shown by the company's organization chart reproduced in Exhibit 1. The primary responsibility of the stores manager was to have materials and operating supplies on hand when they were required. His responsibility extended also to the receiving and inspecting of incoming goods and to salvage preparation and disposal. The company carried in stock over 12,000 items of materials and operating supplies. On April 1, 1934, the value of the stocks on hand was nearly $600,000; it was estimated that this was sufficient stock for from five to six months' production, while ordinarily from two to three months' supply was carried.

Annual purchases of the Ditmar Rubber Company averaged slightly less than $2,000,000. The buying personnel consisted of the purchasing officer and three assistant buyers. It was the company's policy to let market conditions determine to some extent the quantity of stock carried in the more speculative commodities. On one occasion, rubber sufficient for an estimated 18 months' consumption was carried in the storerooms. The purchasing officer did not buy futures in his speculative purchases of rubber, because he believed that in the case of rubber the premium paid for futures contracts was in excess of the company's carrying costs. The policy of forward buying was extended to commodities other than rubber and fabrics when the purchasing department was convinced that market conditions justified such buying. The purchasing officer believed that, in general, buying on a falling market was preferred to buying on a rising market. In other words, he believed that, on the average, better prices were obtained by spreading purchases on a falling market than were obtained by postponing purchases until the lowest prices were reached and then making large commitments on a rising market.

On April 1, 1934, inventories of the Ditmar Rubber Company were roughly valued by groups as indicated:

Rubber	$200,000
Reclaim	4,800
Compounding materials	60,000
Fabrics	160,000
Scrap rubber	12,000
Mechanical items	20,000
Aluminum	2,000
Office supplies	6,000
Findings	40,000
Tool crib (supplies, etc.)	4,000
Fuel	2,000
Lining material	16,000
Packaging supplies	24,000
Leather tops	10,000

In the office a perpetual inventory record was maintained for each item of stock. This record was kept in loose-leaf books, a page of which is shown in Exhibit 2. In the storeroom a bin tag (Exhibit 3) was kept for all items with the exception of crude, scrap, and reclaimed rubber; compounds; and fabrics. The

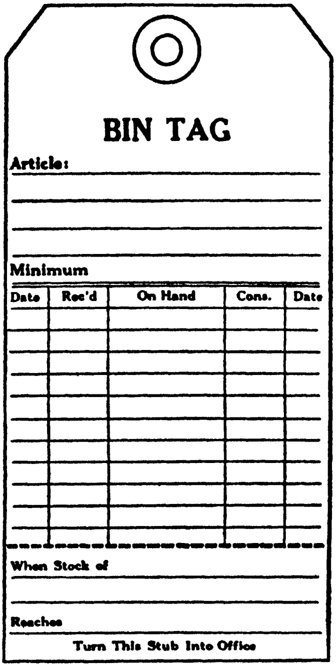
PURCHASES AND RECEIPTS							DISBURSEMENTS						DISBURSEMENTS					
Date	Order No.	Quantity	Date rec'd.	Quantity	Unit price	Amount	Date	Div. 1	Div. 2	Misc.	Req. No.	Balance	Date	Div. 1	Div. 2	Misc.	Req. No.	Balance

TIME REQUIRED FOR DELIVERY	SYMBOL	SEC.	UNIT	DESCRIPTION

EXHIBIT 2.—Ditmar Rubber Company. Perpetual inventory record.

amount shown on the bin tag was checked each time additional stores were put in the bin; this method provided a recurring check on the accuracy of the amount shown on the tag. Semiannually the perpetual inventory records were taken into the storeroom and compared with the bin tags. The infrequent discrepancies required only small adjustments.

Under the company's system of inventory control, items were classified into three groups, each of which received a different type of treatment. Speculative materials were in one group, mechanical items were in a second group, and the third group, which was the largest of all, was composed of the remaining items.



BIN TAG

Article:

Minimum

Date	Rec'd	On Hand	Cons.	Date

When Stock of

Reaches

Turn This Stub Into Office

EXHIBIT 3.—Ditmar Rubber Company. Storeroom bin tag.

1. The speculative group of materials consisted of crude, scrap, and reclaimed rubber; compounds; and fabrics. Although the stores department provided storage for these materials, distributed them to the using departments, and kept inventory records for them, the purchasing department was responsible for determining how much to keep in stock, the amounts to purchase, and the time at which to place the order. Decisions involving major commitments in rubber or fabrics were made only after consultation with the company executives. So far as the stores department was concerned, stock control of these goods consisted only of keeping the records and submitting to the purchasing department both periodic and specially requested reports concerning the amounts on hand. When for speculative reasons large stocks of these materials were on hand, there was no problem involved in meeting production requirements. There was a problem of this nature, however, when market conditions were such that the company's stocks were at a low level. At such times

the purchasing officer, who was responsible for the inventory control of the speculative group of materials, had the stores department send him reports at intervals which grew more frequent as stocks became lower. Production schedules likewise were watched closely at these times. Buying was seldom postponed, however, when stocks became lower than an estimated month's supply on hand and on order.

2. A system of maximum and minimum limits was used for the inventory control of the mechanical items. This group included the following subgroups:

Pipe fittings.
Electrical supplies.
Valves.
Iron.
Oil.
Carpenter shop.
Tin shop.
Paint shop.
Model.
Bolts.
Hardware.
Castings.
Machine parts.
Belting.
Cement.
Packing.
Plumbers' supplies.
Production supplies.
Truck parts.
Area stock.

These were chiefly operating supplies, whose prices did not fluctuate greatly; the investment in any item within the group was relatively small. Moreover, they were standard supplies, and there was little danger of their becoming obsolete. They could be obtained on short notice without question when the minimum was reached; at the same time, there was no advantage in buying beyond normal requirements. The usual value of the entire stock of mechanical items did not exceed $20,000. The maximum and minimum limits used in this group of items were changed infrequently, and there was no provision for systematically reviewing them. In this department the bin tag (Exhibit 3) fulfilled its greatest usefulness. It was perforated so that the bottom part could be sent to the office when the minimum was reached. This device provided an additional check which became operative if an error was made in the record or if the stock records clerk failed to observe from the perpetual inventory record that the minimum had been reached.

3. The remaining group of stocks included the following items: aluminum, office supplies, findings, tool crib, fuel, lining material, packaging supplies, and leather tops. Originally the inventory

control of these items had consisted of a system of maximum and minimum limits which operated in the same manner as that used for the mechanical items. After 1932 the policy of forward buying had resulted in such a condition of overstocking as to make the limits meaningless. Moreover the growing importance of the style factor in the company's products, combined with the uncertainty of future orders, made the operation of this mechanical method of inventory control obsolete. For these reasons the system was considered unworkable for this group of items and was abandoned, although it was supposed that ultimately a similar system would again be installed. In 1934 the following method of control was being used for this group of items:

Those persons in the stores department who were concerned with inventory control received each month from the production control department a "materials estimate" which served to keep them familiar with the material requirements of probable production. In the middle of each month, an attempt was made to plan production definitely for the following calendar month and tentatively for the next two months. The production plans for the following month were based upon unfilled customers' orders plus the amount by which the merchandise department estimated that sales would exceed these orders. Estimated sales were reported to the production control department in the form of a "pairs authorization." In the pairs authorization, estimated sales, in pairs, were classified into 14 groups, of which rubber gaiters, regular tennis shoes, and sandals are typical. From shoe specifications the materials estimating department converted the pairs authorization into a detailed list of materials required. This detailed list became the materials estimate.

Excerpts from a findings estimate are shown in Exhibit 4. This particular estimate was effective for the production period beginning April 30. On the left-hand side of the statement are listed the various findings used in production. In the first column are listed the unfilled orders which were on hand as of the date the statement was drawn up and which had not been included in previous production schedules. The next column records the total production which was scheduled for the five weeks beginning April 30. This schedule included the goods required by the unfilled orders plus the amount by which the merchandise department estimated sales would exceed unfilled orders. In the third

EXHIBIT 4
DITMAR RUBBER COMPANY
Excerpts from Findings Estimate for Production Period Beginning April 30, 1934
(Expressed in physical units)

Item			Unfilled orders not scheduled	5 weeks	2 months
Buttons:					
ZX 2231	18	Black	114,450	194,550	326,800
		Brown	245,350	417,050	700,560
		White			
ZX 2238	18	Black			
		Brown			
1897	24	Black	2,500	3,500	7,150
1954	24	Black	1,250	1,750	3,550
(Sockets, posts, and studs to equal button requirements.)					
Tennis buttons:					
300		Black			
		Brown			
		White			
Slides:					
544					
236 Lyne	44	Nickel			
(Posts and studs to equal slide requirements.)					
Eyelets:					
Ansonia		White	765,200	1,469,200	3,937,496
		Beige			
		Suntan			
(No. 7 White Atlas)		No. 2 Vulcanized White	264,200	507,300	1,359,400
145		Atlas Zinc	859,900	980,300	
		Federal Brown			
No. 1		Invincible Nickel			
		Invincible White	4,150	7,950	212,500
No. 3		Invincible White	14,400		
No. 1		Madison Nickel	171,000	328,300	879,800
No. 2		Madison Nickel	444,000	852,500	2,284,650
		Madison Black	750	1,475	3,950
		Madison Brown	15,200	29,200	78,050
No. 276 and 277 C.		Nickel			
No. 1		Madison Black			
Hooks:					
No. 1386		Brown			
Buckles:					
No. 3		Black	115,250	147,600	270,650
No. 4		Black	165,950	232,400	474,000
No. 6		Black	53,500	74,900	152,800
No. 6		Brown			

column are entered the findings requirements of the tentative production scheduled for the following two months.

The chief purpose of the materials estimate was to give the best indication possible as to what materials would be required. In practice it was found necessary to adjust the preplanned production schedules throughout the month. Uncertainty as to future orders made it unwise to attempt detailed production scheduling sufficiently in advance to permit the use of the materials estimate in purchasing the materials required for production at the beginning of the scheduled period. The materials estimate did not reach the stores department until some time after the first week's production was started.

The system replacing the use of maximum and minimum limits for the third group of items involved constant surveillance of stock balances by the two assistants to the stores manager. All items were segregated into "active" or "inactive" lists. Every day a list of active items was compiled, and the stocks on hand were reviewed in the light of the assistants' knowledge of the normal consumption of each item and the production rate of those lines which required the item. The inactive list was reviewed in the same way once each week.

When in the judgment of the assistant stores managers the supply of a given material in this group was low, a purchase requisition was made. This form was made out in triplicate, two copies being sent to the purchasing department and one retained in the stores department. The stores department was responsible for specifications and quantity of material ordered. After the purchase order was placed, the purchasing department filled out the lower part of its two copies of the purchase requisition and returned one of them to the stores department. The third copy was then destroyed. The date on which the order was placed, the order number, and the quantity ordered were entered in the left-hand column of the proper perpetual inventory record sheet (Exhibit 2).

Prior to 1930 all materials, in all three groups of items, were delivered to the using departments on the basis of requisitions made by authorized persons in the using departments. This system had proved unsatisfactory in that, since the using departments were lax in requesting the proper amount of goods, excess materials tended to accumulate in the factory. The correction of this wasteful system was to have the production control department send direct to the stores department a "material breakdown" of scheduled production. This statement, which was prepared at intervals of two or three days, indicated the

EXHIBIT 5
DITMAR RUBBER COMPANY
Material Breakdown of Scheduled Production
July 10, 1934

Description	2 day	1 day		0 day		Total Req. Iss.
	Lining Bldg. D-2 Req. Iss.	Fitting Bldg. K-2 Req. Iss.	Prepara-tory Bldg. E-2 Req. Iss.	Gaiter Pkg. Bldg. J-4 Req. Iss.	Gum Shoe Pkg. Bldg. P-2 Req. Iss.	
ZX 2092/18						
Pat No. 25 HB						
Blk 5004				422		
Brn 5013		1,361		340		
ZX 2231/18						
Blk 5004		38	29,478	1,777		
Brn			22,340	263	2,365	
Wht 1055						
No. 143 Socket		1,399	51,867	2,802	2,365	
No. 204 Stud				4,264	54,283	
No. 182 Post				4,264	54,283	
No. 1897-24						
Blk 908				504		
Brn 903						
No. 1954-24						
Blk 908						
No. 73 Socket				504		
No. 130 Stud				1,008		
No. 88 Post				1,008		
No. 544 Slide						
No. 550 Stud						
No. 550 A Post						
No. 55902 Slide						
No. 48978 Socket						
No. 12402 Eyelet						

materials which would be needed for production as well as the proper place and time of delivery. Exhibit 5 shows a typical statement of this type. This particular breakdown refers to the button and stud requirements for the light gum shoes department for July 10 and 11. Under the column captioned "0 day" are listed the button and stud requirements for the date of the statement. The explanation at the head of the column indicates the point of delivery. Under the column labeled "1 day" are the scheduled requirements for the first day after the date of the statement. For all practical purposes this material breakdown was a requisition on the stores department. The stores manager believed that this system worked satisfactorily, inasmuch as the waste incidental to the preceding method had been eliminated and the amount of clerical work for both the stores and the requisitioning departments had been reduced. Under either method it was necessary for the scheduling department to prepare the material breakdown.

28. LAMPSON MANUFACTURING COMPANY

COORDINATION OF INVENTORIES WITH PRODUCTION

Heavy losses incident to the disposal of an obsolete inventory of finished refrigerator units and parts at the end of 1932 and costly disruption of production schedules due to the shortages of materials in the following year made it important, at the beginning of the 1934 season, that the Lampson Manufacturing Company devise a dependable method of coordinating purchasing, production, and sales.

Before 1929 the Lampson Manufacturing Company was engaged primarily in the production of electrical railway equipment. Because of the inactivity in the production of railway equipment after 1926, the company sought additional products adaptable to its production facilities. In 1929 arrangements were made to manufacture the refrigerator units for the three models of mechanical refrigerators sold by the Douglas Company's nation-wide chain of department stores. The refrigerator unit became an item of increasing importance in the Lampson company's sales and was responsible for the remarkable sales record which the company made during the succeeding years. Actual sales for the years 1928–1933 together with a late season estimate of sales for 1934 were as follows:

1928	$ 578,000
1929	562,000
1930	645,000
1931	1,770,000
1932	1,539,000
1933	926,000
1934 (estimated)	2,698,000

Since the Lampson refrigerator units were distributed predominantly by the Douglas chain, the Lampson company's selling function in connection with these units was largely that of order taking. Orders were received from the individual stores requiring refrigerators, and shipments were made directly to them. At the Douglas Company's home office there was a central department which controlled the refrigerator selling activities of all its stores. Because the Lampson Manufacturing Company had no direct contact with the market, it was dependent upon this centralized department in the Douglas organization for sales information and estimates. These were transmitted through control orders, monthly sales estimates, cabinet production schedules, and frequent personal contacts between the executives of the two concerns.

The control order placed by the Douglas Company's central department was a blanket order stating a conservative estimate of the season's[1] requirements of refrigerator units as a total and broken down by models. This order specified no dates, either for the initial shipment or for the completion of deliveries. The chief purpose of the control order was to give the Lampson Manufacturing Company an indication of what the season's requirements would be, so that it could plan production schedules and provide for material requirements. Although the order was legally enforceable, it was not so considered by either of the two companies. The Lampson executives believed that it was to their advantage to have the Douglas Company make the best possible estimate of sales rather than an estimate which hedged unduly against possible sales difficulties.

In theory a control order was sufficient to cover the entire season's requirements. Since the order was placed the first of October, however, and the selling season did not start until the first of the following year, it was difficult to estimate accurately the number of units which would be sold. For that reason the order was usually for an amount somewhat less than actual sales expectancy. For instance, if the Douglas organization expected to sell 30,000 units, the control order might be placed at about 20,000; and the order, together with supplementary information as to actual expectations, would be forwarded to the Lampson Manufacturing Company. If subsequently it became apparent that the amount ordered would fall below actual sales, then supplementary orders were placed.

As the season progressed, the Douglas Company forwarded monthly estimates of sales based on the near-time retail sales outlook. Because the procurement and process time in the Lampson plant was from 9 to 12 weeks, these monthly estimates were not received early enough to be of much assistance for production planning. Their principal value lay in the fact that they indicated cumulative shortages or overages and were helpful in realigning the model breakdown.

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[1] The actual beginning of the season was the first of the year. The most active selling season began about the middle of March and extended through the middle of June, during which time nearly 70% of the year's sales were made.

The refrigerator cabinets in which the units were sold were manufactured by the Torbert Manufacturing Company. This company forwarded copies of its production schedules to the Lampson company. The schedules were of value because they served as a means of coordination between the production of units and the production of cabinets, particularly with reference to the required number of each model.

The element of personal contact between the executives of the Douglas Company and the executives of the Lampson Manufacturing Company was of growing importance. All information concerning special sales or promotional work was freely discussed at the beginning of the season. As the season progressed, frequent consultations were arranged, at which the executives discussed the outlook for refrigerator sales. If at any time conditions changed, the Lampson Manufacturing Company was advised immediately in order that production plans and arrangements for materials might be adjusted accordingly.

In addition to the information received from the Douglas Company, the Lampson executives attempted to develop, on the basis of past experience, a seasonal index of sales by which to judge other estimates. They realized, however, that the experimental nature of the Douglas selling campaigns during the early years in which mechanical refrigerators had been sold, and the relatively short experience upon which the index was based, made the index of questionable dependability. Another factor taken into consideration after the season was in progress was the trend of that season's sales. This was particularly useful in checking the proportion of each of the three models for which production schedules were provided.

Inventory control of materials and parts was under the supervision of the production manager. The company followed a definite policy of keeping these inventories at a minimum level. A definite reserve stock was set up as a buffer on all items with the exception of standard bolts, small springs, and similar articles. An attempt was made so to schedule incoming shipments that materials could be moved directly from the receiving platform to the using department or assembly line. This policy required close scheduling of materials from suppliers. The strictness with which this policy was adhered to was dependent somewhat upon the value of the item. For instance, electric motors, which involved a relatively large investment, were scheduled very closely, whereas the inventory of copper tubing did not receive so much attention.

The value of annual purchases was approximately 50% of sales. Materials purchased were of three distinct classes: (1) raw materials, including steel, copper, bronze, etc., from which were made rotors, evaporators, and similar articles; (2) semifinished parts, including such items as castings, springs, lids, and porcelain parts, each of which was partially processed; (3) finished parts, including motors, expansion valves, condensers, etc., which without further processing were incorporated in the finished product.

A technical research division of the engineering department of the Lampson Manufacturing Company performed the developmental work on the refrigerator units. Because of the improvements constantly being made, the experience of the company had been that a new model was introduced each season. It was therefore important that no inventory of finished parts or assembled units be carried over at the end of the season.

During 1932 sales of refrigerators fell below the estimated figure stated in the control order for that period. The Lampson Manufacturing Company had placed considerable reliance on the control order, and as a result its production was in excess of sales to the extent of nearly 2,000 units. If this inventory was carried into the following season, the introduction of the new model which had been developed to improve the competitive position of the refrigerator would be delayed and the Douglas Company's sales would be jeopardized. It was finally decided to cut the retail price substantially and to dispose of the stock through the regular channels, thus making it possible to place the new model on the market at the beginning of the next season. The loss resulting from this procedure was borne by both companies.

In 1933 an attempt was made to control production more closely so as to prevent a repetition of the previous year's experience. In order to control the production of finished parts and units, it was necessary to control also the rate at which materials were scheduled into the plant. Whereas the company had previously undertaken to schedule closely only those items of substantial value, it now undertook to extend this policy to include all items, irrespective of the investment which the inventory involved. As a consequence production was often interrupted because of material shortages. In many instances, delays which were costly in both time and sales volume resulted from a shortage of an item, the whole season's supply of which involved only a few dollars.

At the end of the 1933 season the organization of the company was as indicated in Exhibit 1.

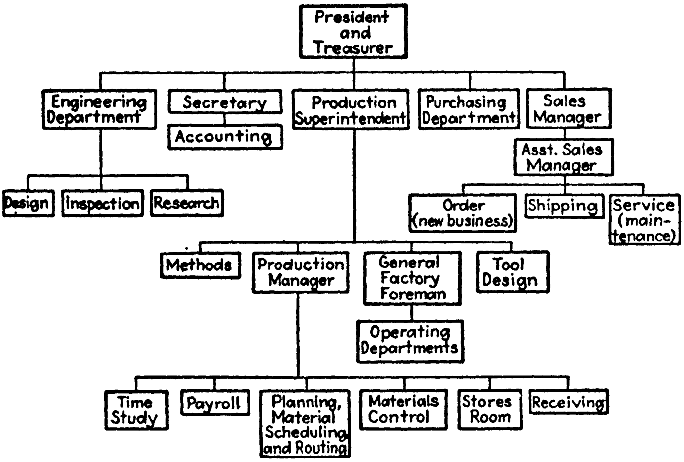


EXHIBIT 1.—Lampson Manufacturing Company. Organization chart, 1933.

Before the beginning of the 1934 production season the president of the company requested the assistant sales manager, the production manager, and the purchasing officer to draw up a new material scheduling plan which would eliminate the weaknesses noted during the previous two years' experience. These three men were selected because their respective functions were closely concerned with the problem of coordinating purchasing, production, and sales. The assistant sales manager was responsible for receiving orders from the individual stores, for shipping refrigerator units to meet these orders, and for controlling service work on the units returned from actual operation for repairs. The production manager supervised the materials control department and was therefore responsible for designating the time at which materials were to arrive at the plant, as well as for controlling production schedules. The purchasing officer was responsible for maintaining contacts with suppliers and for having materials at the plant at the time specified by the materials control department.

The new materials scheduling plan made wide application of the principle of using buffer stocks. Provision was made for the maintenance of a buffer stock of every item purchased, in order to minimize the danger of very close scheduling of materials; and at times the supplier was required to carry a buffer stock as well. Provision was also made for buffer stocks for parts fabricated in the Lampson plants; and a buffer stock of finished units was provided to form a reserve between production and shipments. In some instances a single item involved three distinct buffers. The pump cylinder used in all three models of refrigerator units is a case in point. The supplier was required to carry a buffer of 2,000 semifinished cylinders ready for shipment; a buffer of 1,500 was carried at the Lampson plant in the same semifinished state; and 3,000 were carried as a finished part buffer.

The plan operated as follows:

Upon receipt of the control order and its supplementary information, arrangements were made for a conference of the major officers of the company and the assistant sales manager, the purchasing officer, and the production manager. The purpose of this conference was twofold: (1) to determine, in the light of both the control order and the full season's sales estimate, how many units of each model should be carried in the finished stock buffer; (2) to determine how much of the initial control order should be covered by material contracts. It was the policy of the company never to place material contracts in excess of the production requirements covered by control orders. The procedure was to make commitments for a portion of the units so covered; the designation of the portion to be committed for was a matter of executive concern.

Ninety days before the date estimated for making the first shipment of finished units, a written memorandum giving the data contained in the control order and the full season's sales expectancy was submitted by the order department to both the production manager and the purchasing officer. The 90-day period was specified in order to allow the production department ample time

EXHIBIT 2
LAMPSON MANUFACTURING COMPANY
Estimate of Shipments
Date: December 14, 1933

Week beginning		1/22	1/29	2/5	2/12	2/19	2/26	3/5	3/12	3/19	3/26	4/2	4/9	4/16
Weekly	J	105	105	92	92	92	92	172	272	292	292	312	312	312
Accumulated schedule	J	105	210	302	394	486	578	750	1,022	1,314	1,606	1,918	2,230	2,542
Weekly	K	200	242	374	421	621	781	787	807	807	800	800	800	800
Accumulated schedule	K	200	442	816	1,237	1,858	2,639	3,426	4,233	5,040	5,840	6,640	7,440	8,240
Weekly	L	13	14	14	13	13	13	24	24	25	25	15	15	15
Accumulated schedule	L	13	27	41	54	67	80	104	128	153	178	193	208	223
Total weekly schedule	...	318	361	480	526	726	886	983	1,103	1,124	1,117	1,127	1,127	1,127
Total accumulated schedule	...	318	679	1,159	1,685	2,411	3,297	4,280	5,383	6,507	7,624	8,951	9,878	11,005

to plan to meet shipping requirements and to build such buffers of parts and finished units as had previously been determined.

Six weeks before the first shipment of finished products was to be made, the order department submitted to the production and purchasing departments an estimate of shipments (see Exhibit 2). This estimate of shipments covered a 13-week period and was prepared so as to be in the hands of the production manager and the purchasing officer on Thursday of each week. It included the estimate of shipments in each model for each week and also the cumulative totals of each model. Cumulative totals were used in all statements of this nature to facilitate checking the closeness with which production was following shipments and therefore the status of the finished stock buffer.

On the basis of the estimate of shipments provided by the order department, the production department prepared a manufacturing schedule (see Exhibit 3). The purpose of this schedule was to fix the rate of production so that the semiprocessed and finished products buffers would be maintained and the requirements of the shipping estimate could be met. This schedule, which likewise covered a 13-week period, indicated the requirements of completed units by models and also the totals of the various combinations of models and parts. For instance, in the lines devoted to models JK were indicated the weekly production and the cumulative totals of production for these two models. In the lines devoted to models JKL were shown the totals of all unit production. These various combinations of models were useful in that in some instances parts were interchangeable.

The production department also drew up an assembly schedule (see Exhibit 4) on the basis of the estimate of shipments. Near-time estimates of shipments and figures for actual shipments were useful in making out the assembly schedule. This schedule was drawn up for a sufficient period ahead to maintain the buffer of finished units and to meet shipping requirements. It was not, however, drawn up to cover so long a period as were the shipping estimates or the manufacturing schedules because the assembling of units was a relatively short-time process. This assembly schedule likewise showed models and combinations of models. It was to the company's advantage to carry inventories of parts rather than assembled units for several reasons. It was possible to avoid both the added cost involved in the purchase of finished

EXHIBIT 3
LAMPSON MANUFACTURING COMPANY
Classified Manufacturing Schedule
Date: December 14, 1933

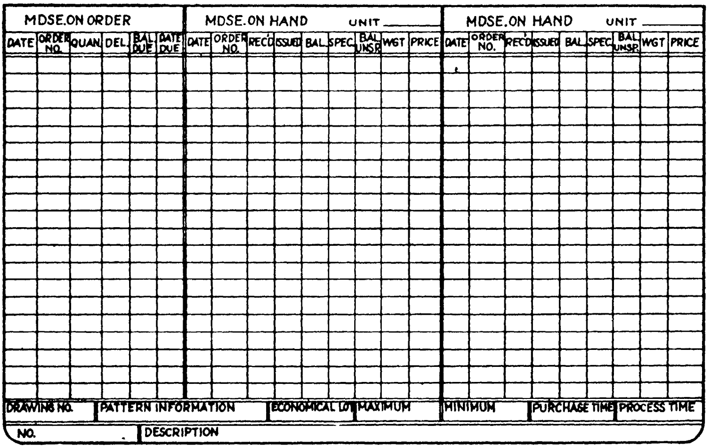
Week beginning		12/18	12/25	1/1	1/8	1/15	1/22	1/29	2/5	2/12	2/19	2/26	3/5	3/12
Weekly	J	0	0	225	200	200	200	200	200	200	200	200	200	200
Accumulative	J	0	0	225	425	625	825	1,025	1,225	1,425	1,625	1,825	2,025	2,225
Weekly	K	0	0	400	400	400	400	800	800	800	800	1,150	1,150	1,150
Accumulative	K	0	0	400	800	1,200	1,600	2,400	3,200	4,000	4,800	5,950	7,100	8,250
Weekly	L	0	0	0	375	0	0	0	0	0	0	0	0	0
Accumulative	L	0	0	0	375	375	375	375	375	375	375	375	375	375
Weekly	JK	0	0	625	600	600	600	1,000	1,000	1,000	1,000	1,350	1,350	1,350
Accumulative	JK	0	0	625	1,225	1,825	2,425	3,425	4,425	5,425	6,425	7,775	9,125	10,475
Weekly	KL	0	0	400	775	400	400	800	800	800	800	1,150	1,150	1,150
Accumulative	KL	0	0	400	1,175	1,575	1,975	2,775	3,575	4,375	5,175	6,325	7,475	8,625
Weekly	JKL	0	0	625	975	600	600	1,000	1,000	1,000	1,000	1,350	1,350	1,350
Accumulative	JKL	0	0	625	1,600	2,200	2,800	3,800	4,800	5,800	6,800	8,150	9,500	10,850

EXHIBIT 4
LAMPSON MANUFACTURING COMPANY
Classified Assembly Schedule
Date: January 12, 1934

Week beginning		1/15	1/22	1/29	2/5	2/12	2/19	2/26	3/5	3/12	3/19	3/26
Weekly	J	0	200	200	300	500	500	0	300	300	300	
Accumulative	J	0	200	400	700	1,200	1,700	1,700	2,000	2,300	2,600	
Weekly	K	0	300	300	500	700	1,000	1,500	1,200	1,200	1,200	1,200
Accumulative	K	0	300	600	1,100	1,800	2,800	4,300	5,500	6,700	7,900	9,100
Weekly	L	0	100	100	0	0	0	0	0	50	100	0
Accumulative	L	0	100	200	200	200	200	200	200	250	350	350
Weekly	JK	0	500	500	800	1,200	1,500	1,500	1,500	1,500	1,500	1,200
Accumulative	JK	0	500	1,000	1,800	3,000	4,500	6,000	7,500	9,000	10,500	11,700
Weekly	KL	0	400	400	500	700	1,000	1,500	1,200	1,250	1,300	1,200
Accumulative	KL	0	400	800	1,300	2,000	3,000	4,500	5,700	6,950	8,250	9,450
Weekly	JKL	0	600	600	800	1,200	1,500	1,500	1,500	1,550	1,600	1,200
Accumulative	JKL	0	600	1,200	2,000	3,200	4,700	6,200	7,700	9,250	10,850	12,050

parts required to complete the unit and the expense of assembly. Moreover, since many parts were interchangeable among models, inventories carried in parts rather than in finished units resulted in greater flexibility in that they permitted changes in the assembly schedule.

Copies of the manufacturing schedule and of the assembly schedule were sent to the purchasing and order departments to keep the purchasing officer and the assistant sales manager informed as to plans. One copy of each schedule was retained for the use of the materials control department. They were used at the beginning of the season to determine the rate at which materials were scheduled into the plant. As the season progressed, they were of value in checking releases to see that materials were ordered and on the way to the plant in time for production requirements. Checking in this way was facilitated by the form in the materials control ledger (see Exhibit 5) which was used by the materials control department.



MDSE. ON ORDER						MDSE. ON HAND						UNIT			MDSE. ON HAND						UNIT		
DATE	ORDER NO.	QUAN.	DEL.	BAL. DUE	DATE DUE	DATE	ORDER NO.	REC'D	ISSUED	BAL.	SPEC.	BAL. UNSP.	WGT	PRICE	DATE	ORDER NO.	REC'D	ISSUED	BAL.	SPEC.	BAL. UNSP.	WGT	PRICE
DRAWING NO.			PATTERN INFORMATION					ECONOMICAL LOT				MAXIMUM			MINIMUM			PURCHASE TIME			PROCESS TIME		
NO.				DESCRIPTION																			

Exhibit 5.—Lampson Manufacturing Company. Materials control ledger form.

The information called for at the bottom of the sheet was provided by the engineering and purchasing departments. Such information as was required to fill out the sections for drawing number, pattern information, and part number was derived from the specification sheets provided by the engineering department. The purchasing department provided information pertaining to the size of economical lots to purchase, supplier's process time, and normal transit time. In the description section was entered information concerning the models in which the part or material was used and specifications of the item. The section in the right-hand corner referred to the material process time within the Lampson plant.

After the conference of executives had determined the extent to which the initial control order should be covered by material commitments, the purchasing department proceeded to place contracts for materials up to those limits. At the time a contract for materials was placed, the top line in the column for merchandise on order was filled in. Under this entry were listed the material releases to be placed against the covering contract. On the basis of the manufacturing and assembly schedules the materials control department determined the amount of released materials and the time at which that amount should be received at the plant. The time for sending release requisitions to the purchasing department was determined on the basis of the procurement time plus the internal process time.

Since the releases for incoming materials were determined on the basis of the manufacturing and assembly schedules, they were not altered until the production schedules were either increased or decreased. In such a situation the system was not disrupted. Balance was maintained either by moving all schedules up one week or by setting them back a week, as the case required. On these occasions it was often necessary to draw on the buffer stocks, both in the Lampson plant and in suppliers' plants. As the season progressed, the materials control department sent to the purchasing department requisitions for release of materials as the records indicated they were needed.

The materials control department and the production manager were charged with the responsibility of separating all purchased materials into classifications and of establishing the amount of buffer stock for each class. Each item purchased was examined on the basis of economical lots to process, internal process time, supplier's process time, normal transit time, and unit cost of the item.

Four classes of materials were used. Class A items included parts and materials of which the unit cost was over 50 cents or parts reserved for special consideration such as those requiring

EXHIBIT 6
LAMPSON MANUFACTURING COMPANY
Class A Material Buffer Stock

	Price			Time		Buffer here		Supplier buffer	Capital tie-up	
	Model J	Model K	Model L	Supplier (days)	Factory (days)	Rough	Finished		Rough	Finished
Cylinder	$ 0.189	$ 0.182	$ 0.189	21	35	1,500	3,000	2,000	$ 286	$ 1,386
Rotor	0.063	0.063	0.068	36	56	1,500	3,000	3,000†	95	2,059
Comp. blade	0.029	0.029	0.035	38	7	2,000	3,000	4,000†	43	117
Seal ring	0.025	0 025	0.025	36	35	2,000	4,000	3,000†	38	333
Comp. frt. brg	0.134	0.134	0.134	28	32	1,500	3,000	2,000	200	491
Top plug	0 030	0.030	0.030	26	28	2,000	5,000	2,000†	57	143
Plug bottom	0 030	0.030	0 030	26	28	2,000	5,000	2,000†	57	143
Comp. rear head	0.093	0.093	0.093	28	28	1,500	3,000	2,000	139	764
Bellows	0.149	0.149	0.149	20	7	.....	2,000	2,000	......	299
Taper connector	0.018	0.018	0.018	47	14	1,500	4,000	4,000†	27	454
Chg. valve body	0.052	0 052	0 052	40	14	1,500	4,000	4,000†	78	156
Receiver*	0.601	0.601	0 601	20	14	.....	2,000	2,000	......	1,202
Evap. side baffle*	0.246	0.285	0.325	38	7	.....	.....	2,000		
Evap. front*	0.289	0.328	0 367	38	7	.....	.....	2,000	. . ..	650
Ice tray and grid.*	0.910	0.455	0 910	35	7	.....	.... .	2,000		
Tin*	0.390	0.390	0.390	7	2	.....	2,000	......	......	780
Frt. head	0.598	0.598	0.598	21	42	1,500	3,000	2,000	897	3,510
Dome*	0.266	0.266	0 293	36	14	2,000	2,000	3,000†	260	606
Thermostat*	3 289	3.289	3.289	25	7	.....	2,000	2,000	......	6,578
Condenser core*	1.014	1.014	1 924	23	7	.....	2,000	2,000	......	3,042
Dessert tray and grid.*	....	1.001	1 001	35	2	.....	. . .	2,000	......	1,001
Motor*	9.750	9.750	9.750	28	7	.....	2,500	3,000		
Expansion coil*	0 526	0 604	0.721	22	7	2,500	500	2,000	1,300	325
Expansion valve*	2.626	2 626	2.626	25	7	.....	2,000	3,000	..... .	5,252
Lid top*	0.234	0.234	0.234	42	14	.....	3,000	4,000†	......	936
Lid top pan	....	....	....	..	..	.....	1,000	2,000		
Lid insulation*	0.260	0.260	0.260	18	14	.....	2,000	3,000†	......	780
0.032-in. by 11-in. by 57½-in. brass	0.214	0.224	0.267	27	14	3,500	1,000	3,000†	1,092	510
	0.224	0.267	0.324	27	14	3,500	1,000	3,000†		
Evap. door*	0 268	0 289	0.315	35	7	.....	.....	2,000	......	572
	$22.517	$23.286	$25.018						$4,569	$32,089

* On consignment.
† If impossible to obtain supplier's cooperation, then must depend on our buffers as set.

a long process time. Class B items were those which represented a cost of 15 cents to 50 cents in the finished refrigeration unit. Class C items were those which represented a cost of less than 15 cents in the finished units. Class D included the major supply items, the most important of which were solder, paint, and the gas used as a cooling medium in the refrigerators. Buffers of all Class A items were determined for the individual item. Exhibit 6 shows a list of Class A items and the buffers of each. The buffer of Class B items was fixed at sufficient quantities of each item to make 2,500 refrigerator units. The Class C buffer was sufficient for 3,000 units, and the Class D buffer was fixed at 2,000. The aggregate value of all buffers of materials and semiprocessed parts held in the Lampson plant at the beginning of the 1934 season was $49,486.

In the new materials scheduling plan, provision was made to fix the periods covered by requisitions for each of the four classes of items. Requisitions for Class A items were to be made out by the materials control department sufficiently in advance to allow a margin of one week over the procurement time and the Lampson process time, and were to cover a four-week period.

It was the primary responsibility of the purchasing department to have requisitioned materials at the plant at the time specified by the materials control department. However, this department was also responsible for arranging with suppliers to carry such buffer stocks as were believed necessary. The amount of these buffers was decided upon by the purchasing officer with the assistance of the production manager. Actual demands were made for suppliers to carry buffer stocks, and the company had been successful in having these demands complied with. The occasions on which production schedules were moved up were sufficiently frequent to test the suppliers to ascertain whether the buffers were being maintained.

The purchasing department had the authority to change requisitions in the event that there was a decided price advantage at the time initial commitments were made or that savings could be effected through the purchase of carloads or differential loads. In all such instances the materials control department was consulted to determine whether it could comfortably handle such quantities as the purchasing department recommended buying.

The approval of the engineering department had to be obtained when there was any possibility of a change in design or other danger of obsolescence. Also, when the purchasing department found a substitute for the material specified by the engineering department, it had to obtain the permission of the engineering department before the new material could be purchased.

29. NORWALK LAMP COMPANY

COORDINATION OF RAW MATERIALS INVENTORY WITH PRODUCTION

The Norwalk Lamp Company manufactured electric lamp bulbs under a cross-licensing agreement with the owners of the patents on this product. Sales were made throughout the United States chiefly to jobbers; some sales were made also to large individual users, including the Federal Government. In 1932, confronted on the one hand with production delays, resulting from poor coordination of purchases with production requirements, and on the other with the problem of balancing production with sales demands, the company adopted a plan of control which made both the production manager and the purchasing officer responsible for the quantities of raw materials and filament wire on hand.

The company's licensing agreement specified a maximum sales quota based upon the licensor's sales of the same year. Because the quota could not be fixed definitely until the licensor's sales were known at the end of the year, relatively small overages or shortages of sales generally resulted. These small discrepancies were carried over and applied on the following year's quota. Excess sales of any substantial amount, however, were subject to royalties which, in the opinion of the Norwalk management, were sufficiently high to preclude a profit on the excess volume. In both 1932 and 1933 the company had exceeded its quota slightly but had been permitted to carry over the excess into the following year.

The general manager of the Norwalk Lamp Company was the president and also the treasurer of the company. The assistant manager, who reported directly to him, was responsible for sales as well as for supervision of the office work, production, and purchasing. An office manager supervised the office force, which performed the billing and other clerical functions of the business. Included in this force was the stock records clerk, who kept the materials inventory records. A production manager, in addition to supervising the operating department, had charge of the stores room. A purchasing officer was responsible for having materials on hand for production requirements.

Since the sales quota fixed by the company's agreement with the licensor, rather than the company's ability to sell goods, was the limiting factor in scheduling annual production, it was necessary for control purposes to estimate the sales quota at the beginning of each year. This figure could usually be calculated with 95% accuracy. The estimated figure in physical units was used as a basis for monthly production schedules. These schedules also took into consideration the seasonal nature of the business and the amount of finished goods inventory. Monthly production schedules were prepared one month and a half in advance and became the basis of stock control.

The inventories kept by the stores division were divided into "expense items" and "direct materials." Expense items included office and operating supplies. No inventory record was kept of this class of stock, since it was not considered of sufficient importance to warrant a system of records. When goods in this classification were received, they were charged directly to general overhead expense but were kept in the stores department and issued to the using departments only on the basis of requisitions. The only control exercised to insure adequate stock was that provided by the storeskeeper's knowledge of what was on hand. When in his judgment an item was low, a requisition for additional stock was sent directly to the purchasing department. The value of this inventory in July, 1934, was estimated at $3,000.

Direct materials, which included packaging supplies, were divided into the following groups:

1. Glass bulbs.
2. Glass tubes.
3. Filament wire.
4. Lead-in wire.
5. Support wire.
6. Bases.
7. Basing cement.
8. Solder.
9. Mica disks.
10. Packaging supplies.

The amount of these materials usually carried in stock ranged in value from $30,000 to $50,000. The stock records clerk maintained a perpetual inventory record of each item of direct materials. These records were kept in two loose-leaf books: one devoted to filament wire and the other to the remaining groups. Exhibit 1 shows the type of form on which the inventory records were kept; a separate page was devoted to each item of stock.

When an order was placed by the purchasing department, a memorandum was sent to the stock records clerk who entered

NORWALK LAMP COMPANY
STOCK RECORD

Max.	Min.	Size or kind	Article

ORDERED			RECEIVED					DELIVERED				BALANCE ON HAND	
DATE	Order No.	Quantity	Date	R. T. No.	Quantity	Unit price	Value	Date	Req. No.	Quantity	Unit price	Quantity	Value

EXHIBIT 1.—Norwalk Lamp Company. Perpetual inventory record.

the information in the column of the proper page. When the item ordered had been received into stock, the stores division sent the stock records clerk a receiving ticket, from which the clerk recorded, under the Received section of the page, the quantity received and the date of its arrival. The use of the second and fifth columns in this section, which were for the Receiving Ticket Number and Value, respectively, had been discontinued. Also the Unit Price column was not used except to note a price change in goods purchased. Entries in the Delivered section of the page were made from a duplicate of the requisition sheets which were the authorization for issues from the stores division. The Unit Price column here was not used. The Balance on Hand section contained entries only in the Quantity column, except at the end of the month when the Value was extended from information in the Received section on a "first-in, first-out" basis.

The purchasing officer of the company assisted in the control of inventories by checking stocks available for production against production schedules. By consulting the lamp specifications which he maintained on file in his office, he converted the production schedules, which were in units of lamp bulbs, into the direct materials they required. For example, early in April, 1934, the production manager gave him the production schedule for the two monthly periods of April 16 to May 19 and May 21 to June 16. The purchasing officer proceeded to break the schedule down into its requirements of each direct material. Thus on April 21 he computed the quantity of filament wire which would have to be on hand for the May 21 to June 16 schedule. For every type of lamp bulb appearing on the schedule, he determined from his specification file the particular item of wire used in that bulb and the amount, measured in meters, which the scheduled production would require. To simplify his computations, he used the type of record shown in Exhibit 2.

The first three columns of the record were used for entering bulb specifications. The next two were for filament wire specifications. In the next column was entered the stock on hand of each kind of wire, and in the following column the amount which was on order but not yet in stock. This information was obtained from the perpetual inventory record as of the day these computations were made. The next column contained the amounts of each type of wire which the current schedule period, April 16 to

Exhibit 2
Norwalk Lamp Company
Form of Record Used in Determining Material Requirements

Wattage	Voltage	Bulb	May and June wire specifications		As of April 21				Order
			Range (diameter in mm.)	Kind (material content)	Stock on hand	On order	Apr. 16–May 19	May 21–June 19	
15	120	A17	1.32– 1.40	218 1–22	23,544	20,659	22,000	45,000	30,000
15	125–130	A17	1.25– 1.32	218 1–22	2,077	5,000	6,500	9,000	10,000
25	28/34	A19A G18½ T6½	10.8–11.46	218 1–21	3,238	......	2,000	3,500	3,500
25	110	G25, A19A, F15 G18½ T6½	2.86– 3.03	218 1–22	......	7,726	3,000	6,000	3,500
25	115	G25, A19A, F15	2.71– 2.87	218 1–22	56,727	......	23,000	25,000	10,000
	120	A19A	2.56– 2.72	218 1–22	41,371	......	40,000	55,000	60,000

May 19, would require. Then were entered the requirements of the May 21 to June 16 schedule. From the figures for stocks on hand and on order and from the requirements of the scheduled production, the purchasing officer determined how much to buy. Thus bulb A17, which was a 120-volt 15-watt lamp, used wire of the range and specification shown in the fourth and fifth columns. The purchasing officer learned from the perpetual inventory record that on April 21 there were on hand 23,544 meters of wire meeting these specifications. The order record showed that 20,659 meters were on order. In the current monthly schedule bulbs requiring 22,000 meters were yet to be produced, and the May 21 to June 16 schedule required an additional 45,000 meters. In other words he found that he had 44,203 meters available for production schedules and that the schedules required 67,000 meters. He therefore ordered 30,000 meters of wire to cover the shortage.

Inventory control of filament wire had in the past been a source of trouble. Processes which this wire required before actual lamp production took place made it necessary to have it on hand at least ten days before production was started and before the other materials were needed. The delivery period on filament wire was four days; therefore it was necessary to have orders placed two weeks before production was scheduled. Of all the materials for a particular type of lamp, a shortage in wire would be the only one likely to delay production, since the ten-day interval would allow time for procuring the others. Monthly purchases of filament wire averaged from five to six weeks' supply, and a stock of about eight weeks' supply was usually on hand. The wire carried in stock was of some 350 different specifications, 200 of which were used in the usual run of production, the remaining 150 being used only for unusual runs or special orders. Those bulbs which used filament wire of the latter group seldom appeared on the regular production schedules but were scheduled independently, frequently on short notice. They were, therefore, not covered by the usual method of inventory control.

For several possible reasons this method, even as applied to the more active items of wire, did not prevent occasional shortages. In some instances wire proved defective and broke while being coiled into filaments, thereby making it necessary to use more than had been planned. Since the company depended upon its suppliers to provide materials of the proper quality and thus avoided the expense of making its own inspection, such defects as this were not found prior to the production process. In the past, suppliers had been willing to make adjustments for defects discovered even after the materials had been put in process. A more frequent cause of wire shortage was that sometimes, when special orders were put through on short notice, the wire requirements were supplied from stocks which had been reserved for the regular schedule, with the result that there was a shortage when regular production took place.

To remedy this weakness in the company's inventory control, a daily report of the balance on hand of those items of filament wire which had been in active use on the previous day was submitted by the stock records clerk to the production manager. This device was used only for filament wires and supplemented the regular system previously described. The report was submitted to the production manager because he was responsible for the production schedule, and it was thought that he was in the best position to know when additions should be made to stocks. The production manager examined each item shown in the report and made a notation for each, indicating whether the amount on hand was satisfactory and, if not, how much to order. When six or eight items had accumulated, the purchasing officer placed orders for the amounts indicated.

On one occasion a system of maxima and minima had been tried for filament wire, but it was found that the constantly changing specifications imposed by the engineering department made the losses from obsolete goods too high for the successful operation of this mechanical method. Under the existing method, the production manager was kept aware of alterations in specifications through a system which required his signature on specification changes before they became effective. Usually there were from three to six specification changes per week.

In 1933 when the foregoing method of controlling wire inventories was in effect, total goods declared obsolete and disposed of as such amounted to less than $1,000, or an obsolescence rate of less than ¼ of 1%. The amount of obsolete filament wire was negligible.

30. KNIGHT CANDY COMPANY

CONTROL OF INVENTORY BY CANDY MANUFACTURER

In January, 1934, the purchasing officer of the Knight Candy Company decided to re-examine the company's raw materials inventory control method in an effort to determine whether or not it could be improved. The method in operation appeared to be thoroughly satisfactory. However, the purchasing officer wished to assure himself that his department was in the best possible position to contribute to the company's share in any increase in volume of business.

The Knight Candy Company, which was located in Cincinnati, Ohio, produced an extensive line of candies, consisting of everything from nickel candy bars to the highest grades of chocolates. When separate kinds and flavors were considered, the line totaled 12,000 items. About 100 of these items were produced each day. Fast-selling items were made as frequently as every day; average items, every two weeks; and a few, only once a month. Production was by a batch process that turned into a line process for packing. Total sales of the company's products normally amounted to several million dollars a year, of which 90% were made to independent wholesalers and 10% were made chiefly to retailers in the vicinity of Cincinnati. Candy was kept in stock at the factory. Most of the company's products were not highly perishable and would keep at least three months before deteriorating to any considerable extent.

Exhibit 1 indicates the general organization of the Knight Candy Company as of January, 1934. The purchasing officer had under his supervision inventory control of raw materials, inspection, and the disposition of obsolete materials, as well as the actual placing of orders.

The by-laws of the company stated: "No purchases shall be made except by the purchasing department." The by-laws also provided, however, that all unusual expenditures, such as those incurred in the purchase of major equipment, required the approval of the board of directors. All the directors were officers in the company. In accordance with this provision in the by-laws, the purchasing department bought all raw materials and supplies on its own authority and was responsible for inspection, stores control of raw materials and supplies, and the use, sale, or disposition of obsolete materials.

The actual operation of the system of materials control was definitely dependent upon sales and production schedules.

The company made annual estimates of sales by territories, but not by items, based on an examination of the previous year's sales and a forecast of possible changes. The estimates were revised as often as conditions warranted. These figures were not intended as a basis for detailed control but rather as broad estimates to guide the executives in laying plans a little more carefully than would have been possible had no effort been made to estimate sales.

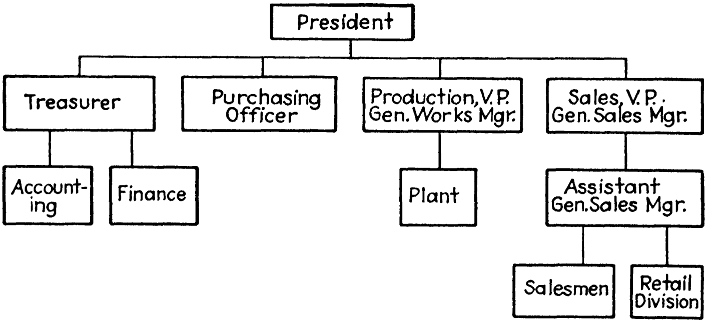

President
Treasurer
Purchasing Officer
Production, V.P. Gen. Works Mgr.
Sales, V.P. Gen. Sales Mgr.
Accounting
Finance
Plant
Assistant Gen. Sales Mgr.
Salesmen
Retail Division

EXHIBIT 1.—Knight Candy Company. Organization chart, January, 1934.

These sales estimates were not wholly adequate for purposes of production control. In order to control finished goods inventories and production, it was necessary to secure actual sales figures by items. Because the executives believed it was advisable to have these figures currently, daily sales figures were compiled by items. This compilation was the basis on which finished goods inventories and production were scheduled.

In order to facilitate the rapid collection of these actual sales figures, an extensive system of Hollerith cards had been installed as far back as 1921. On these cards were compiled sales figures for use in sales analysis and production control. Sales were tabulated from invoices every day, by items and by districts, and the record was used to determine the production for the next few days. The purchasing officer received a copy of each day's sales as soon as it became available from the tabulating machine.[1] From this record and a record of finished goods stocks, he could estimate what the production department would make during the next few days. Since it took only a few hours to obtain almost any one of the raw materials, these estimates enabled him to have the materials on hand when they were needed by the production department. It was not expected, however, that the purchasing officer would actually keep his inventories down to the supplies required for a few days' production. Quantity discounts would often make it advisable to buy larger amounts than were needed for immediate production. Moreover, since peanuts, almonds, and other nuts could not be secured on such short notice as other materials, they had to be stocked in anticipation of requirements.

Hollerith cards were also used to compile inventory figures for raw materials, goods in process, and finished goods. The Hollerith card system for this purpose, however, was not instituted until 1929. Before 1929 the method in effect was that of taking a complete physical inventory monthly and a weekly physical inventory of the major items in stock, both of which were reported to the purchasing officer. When the punched cards were adopted, the weekly physical inventory of major items was retained. A plan was worked out for recording inventory, receipts, and requisitions on cards. (See Exhibit 2.) At the end of each month these cards were sorted by commodities, and the inventory for each commodity was determined from them. This record was used largely for accounting purposes.

The production department of the company watched sales closely and, by means of the daily sales analyses, kept finished goods inventories and production in line with sales. The manufacturing process was a fairly rapid one, and finished goods inventories could be replenished almost as rapidly as they were depleted by sales. If any special campaigns or drives on particular items were planned by the sales department, the production and the purchasing departments were informed of these, so that stocks might be built up to meet the expected increase in sales.

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[1] This system of Hollerith cards had been installed in order to secure a breakdown of sales by *territories*, as well as by items, mainly for use in the sales department. Even before the installation of the Hollerith cards the purchasing officer had received a daily sales report by items, as well as a daily finished stocks and production report, to aid in the scheduling of purchases. The advent of the Hollerith card system, therefore, had little effect on purchasing routine.

As has been stated, the purchasing officer was responsible for inventory control of raw materials and supplies. Stores were kept in the company's own plant. The numerous items were divided into two broad classes: (1) materials in general stores, such as sugar, syrup, nuts and fruits, flavorings and oils, fancy and paper boxes, and miscellaneous packing materials, and (2) supplies, such as factory supplies, mechanical and electrical supplies, fuel, starch, and other miscellaneous supplies.

WEEKLY PHYSICAL INVENTORY OF MAJOR ITEMS

Materials	Unit	Week of	Week of	Week of	Week of
	M				
	Each				
	Lb.				

EXHIBIT 2.—Knight Candy Company. Weekly physical inventory report.

Sugar was purchased by contract from local refineries except when market conditions warranted the use of the spot market. These contracts were placed by the purchasing officer, usually with the advice of the president, who was a former purchasing officer. Each sugar contract was for a definite quantity to be delivered over a period of time not to exceed 30 days, daily orders being placed against it in accordance with the company's production requirements. The delivery service was prompt; an order placed in the afternoon would be filled and ready for use in the next day's production. In anticipation of a price advance the purchasing officer sometimes placed a contract for two or three months' future requirements, but only after consulting the president. At the expiration of the 30-day time limit, the excess quantity of sugar still undelivered had to be transferred to the company's own plant for storage. Definite prices covering the entire commitment were stipulated in these sugar contracts. Payment was made either on a four-payment installment plan or on a regular ten-day cash discount plan. Since there were only two local sugar refineries, the bidding for contracts was more or less a formality. The company tried to deal with equal fairness with both sources, although at times it might slightly favor one or the other. The purchasing officer recognized the necessity for cultivating the goodwill of both suppliers in order to assure himself of a source should either one fail him at any future time. The purchasing officer always maintained close contact with developments and changing conditions in the sugar markets so as to be in a position to purchase more advantageously this highly important raw material.

The purchase of syrups, chocolate, and flavorings was a routine function. They were obtainable from a number of local suppliers on short notice, by contract or not, as market conditions warranted. In no instance was more than a three months' supply purchased unless unusual conditions were anticipated. In such instances the purchasing officer would buy ahead for either one or both of the following reasons: (1) to insure meeting the factory's production requirements; (2) to protect himself against a rise in price.

Other supplies, such as factory, printing, stationery, mechanical, electrical, and engineering supplies, were purchased as an ordinary routine function upon receipt of requisitions. Packing and shipping supplies, however, such as boxes, cartons, and cases, were a major item of the company, and for such supplies the purchasing officer kept well informed on market conditions so as to be in a position to place contracts ahead.

The decision as to whether material was purchased by brand, specification, or other methods of description rested solely with the purchasing department. Some materials, such as flavoring and syrups, were bought largely by brand, while others, including sugar, were bought on a specification basis. When the purchasing department prescribed specifications, it always consulted the using department to insure its active cooperation and to make certain that the specifications met the requirements of that department.

The total cost of purchases in dollars was about 40% to 50% of total sales. Of these purchases, sugar constituted between 35% and 40%; fuel and supplies (factory, packing and shipping, printing, etc.), another 35% to 40%; while syrups, chocolate, flavorings, and other ingredients of the candy made up the remainder. The average inventory of the company ran between $400,000 and $500,000.

Two types of inventory control were exercised: (1) On the major items, the purchasing officer received a weekly physical inventory report, recorded on the form shown in Exhibit 2. (2) On the minor items, there was a daily visual inspection by the stores division. The purchasing officer was in daily contact with the stores division and was informed when any of these minor items were running low and should be reordered.

Since there were only about 100 items involved, control was not difficult and great reliance could be placed upon the good judgment and experience of the purchasing officer. Generally speaking, he tried to maintain a minimum stock of at least two weeks' supply and a maximum stock of not over three months' supply. These general practices, however, were subject to variations resulting from the different kinds of commodities, the time required for delivery, market conditions, etc. In other words these maxima and minima were highly flexible, based essentially on the purchasing officer's judgment.[1] The average purchase was from one to three months ahead but varied with market conditions. Whenever possible, quantity discounts were taken by the purchasing officer.

Five devices were employed by the purchasing department in correlating its purchases and raw materials inventory with production and sales: (1) a three months' estimate of sales and production made by the purchasing officer, (2) the daily sales analysis by items, (3) the daily report of finished goods stocks, (4) the weekly physical inventory of major items (Exhibit 2), and (5) the daily visual inspection of minor items.

1. For his own guidance the purchasing officer first drew up an estimate of production and sales for the next three months. This estimate was based primarily on the previous year's sales for the corresponding period, modified by expected conditions during the period under consideration, and served somewhat as a background

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[1] A book inventory system had been attempted at one time, but it had proved unsuccessful.

for all the purchasing to be done in the next three months. For instance, if the purchasing officer expected generally improved business conditions and better candy sales as well as rising materials prices in the following three months, he might anticipate material requirements further in advance than would otherwise be possible. The estimate was made solely by the purchasing officer, without consultation with the works manager or sales manager. However, if the sales department was planning any special campaigns or drives on certain lines, or if the production department was planning to build up stocks on certain lines, the purchasing officer was informed of these plans, so that he might coordinate his purchases with them and revise his estimates.

2 and 3. From his daily reports of sales by items and finished goods stocks the purchasing officer could estimate the next few days' production and could make sure that the necessary raw materials were on hand to meet these needs, by checking these sales and finished goods figures against his physical inventory report (weekly) on the major items, and the visual report (daily) on the minor items.

4. The weekly physical inventory of major items (Exhibit 2) was probably the most important single device available to the purchasing officer in keeping purchases and inventories in line with production and hence with sales. This information, together with his past experience and intimate knowledge of the various items, enabled him to determine when to reorder. It showed him, at a glance, the extent of stock depletion in the major components of his raw materials inventories due to production during the preceding week, as well as the trend over the preceding five weeks. The report also was a valuable check on the daily sales and finished stocks figures.

5. Finally, by means of the daily visual inspection of minor items, the purchasing officer was informed of any dangerous depletion in these inventories due to production requirements, and could take the necessary steps to replenish them before the shortage could become serious.

This system of raw materials inventory control and correlation of raw materials inventory with production and sales had been in operation for a long period and had proved quite effective. One of its main virtues was its simplicity. The purchasing officer was well satisfied with its results.

31. PIERCE STORAGE BATTERY COMPANY

DETERMINATION OF MOST ECONOMICAL QUANTITY TO PURCHASE

Early in 1931 the purchasing officer of the Pierce Storage Battery Company became much interested in mathematical formulas for determining the most economical quantities to purchase. In commercial periodicals he found several such formulas. A careful examination of their methods revealed that although they varied slightly as to derivation and minor factors the principal difference lay in their treatment of quantity discounts. The purchasing officer selected for detailed study the formula[1] which, in his opinion, was the most satisfactory.

The author of this formula believed that the size of the most economical lot to be purchased was influenced by six factors, all of which could be mathematically treated:

1. The cost of procurement from the time the purchase is requisitioned until the goods are received, checked, inspected, and placed in stores. This includes the expense of receiving and inspecting and the expense of the purchasing department chargeable to the order.
2. The quantity to be purchased for a given period.
3. The interest charges for carrying the inventory.
4. The storage charges other than interest.
5. The reserve stock necessary for emergencies.
6. The unit purchase price.

These factors were combined into an equation by setting the total unit cost of the article as it goes into production equal to the sum of the individual items of cost which were combined to form the total unit cost. Among these items were included price, interest charges, storage charges, etc. By the application of methods of calculus[1] to this equation, the quantity that should be purchased in order to give the minimum total unit cost was found. In the process of the differentiation of the equation to find this minimum unit cost, the factor of emergency reserve stock was eliminated; mathematically, therefore, this factor did not influence the final result. It was apparent that a fixed emergency reserve stock of material (the factor that was eliminated), which is used only when the ordinary purchasing routine breaks down, had no place in a calculation made for routine purchasing. The result of the application of calculus was the equation

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[1] Ralph C. Davis, "Fixing Least-cost Purchase Quantities," *Manufacturing Industries* (now *Factory Management and Maintenance*), May, 1927, pp. 369–372.

For a somewhat similar formula compare Willis Wissler, "The Modern Conception of Purchasing, II and III," *Purchasing Agent* (now *Purchasing*), March, 1930, pp. 247–249, and April, 1930, pp. 355–359; Frank L. Eidmann, *Economic Control of Engineering and Manufacturing* (New York, McGraw-Hill Book Company, Inc., 1931), pp. 99–106. See also Gordon Pennington, "Simple Formulas for Inventory Control," *Manufacturing Industries*, March, 1927, pp. 199–203. For a somewhat similar formula compare Holloway Kilborn, "How Much Should One Buy to Get the Lowest Final Cost?" *Iron Age*, July 24, 1930, pp. 217–220.

See also R. H. Wilson, "A Scientific Routine for Stock Control," *Harvard Business Review*, October, 1934, pp. 116–128.

$$Q = \sqrt{\frac{G}{I + H}}$$

in which Q = the quantity to be purchased.
G = the total procurement expense for the order.
I = the interest factor.
H = the storage factor.

The expense of procurement included all costs incurred from the time the purchase requisition was originated until the goods were received, checked, inspected, and placed in stores. It included such items as the cost of purchase order and other forms; the expense of clerical labor in making out and following up orders, checking invoices, etc.; the time, traveling, and other expenses of executives and buyers which were chargeable against the order; and the expense of receiving and inspecting the goods. The interest factor was calculated by multiplying the unit purchase price by the interest rate and dividing this result by twice the number of units used in one year. This division by twice the number of units was made because the inventory would be constantly decreasing and the interest charge could be made only against the average amount in stock, not against the whole lot purchased. In the same way the storage factor was calculated by multiplying the annual cost per square foot of available storage by the number of square feet necessary to store each unit and dividing the result by the number of units consumed annually. The average amount of space used could not be calculated, because it was necessary to keep for permanent storage space an area large enough to accommodate the whole lot when it first arrived.

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[1] He differentiated the equation for the unit cost with reference to the quantity to be ordered.

For instance: It is expected that during the next three months about 2,500 pieces will be used; annual consumption amounts to approximately 10,000 pieces. The item is stored in bins 2 feet square, having a cubical content of 8 cubic feet. About 500 pieces can be stored in a bin. There are 4 tiers in each bin stack. The present market price is $0.05 per piece. The current rate of interest is 6%. The expense of procurement is about $2.50 per order for this class of supplies. The time of procurement is three weeks. A reserve stock is carried which is approximately 5% of the theoretical minimum. The cost of net storage space per year is approximately $3 per square foot per year. On the basis of the foregoing data, the following computations are made, in which B equals the storage space required per unit of item, S the rate of consumption, and E the storage charge:

$$B = \frac{4}{500 \times 4} = 0.002$$

$$H = \frac{BE}{S} = \frac{0.002 \times 3}{10{,}000} = 0.0000006$$

$$I = \frac{0.05 \times 0.06}{2 \times 10{,}000} = 0.00000015$$

$$Q = \sqrt{\frac{2.50}{0.00000015 + 0.0000006}} = 1{,}826 \text{ pieces}$$

Apparently an order should be placed for about 1,800 pieces, which is approximately nine weeks' supply.

The purpose of adequate stock control is to insure the presence of materials when needed and to avoid the accumulation of unnecessary reserve stocks. Theoretically the time of arrival of new stock should be coincident with the exhaustion of that stock which it is designed to replace. The point at which an order should be placed to insure such a condition constitutes a theoretical minimum ordering point. Since it is unsafe to rely upon so perfect a coordination of purchasing with production, some reserve stock must be maintained. The amount of this reserve stock or the amount by which the actual minimum quantity exceeds the theoretical minimum quantity will obviously vary, but in general it may be said to depend on the characteristics of the item to be purchased and the requirements of the plant.

To continue the foregoing example:

Let T_1 = time required to procure goods, expressed in years.
S = rate of consumption, expressed in pieces per year.
R_1 = the theoretical minimum
$= T_1S$.
Let F = ratio of the actual to the theoretical minimum ordering quantity.
R = the actual minimum
$= FR_1 = FT_1S$.

To determine the minimum ordering point, we may use the equation

$$R = FT_1S$$

Then if $F = 1.05$
$T_1 = 0.0578$ year
$R = 1.05 \times 0.0578 \times 10{,}000$
$= 607$ pieces.

To get away from odd numbers, set the minimum at 610 pieces. When the stock on hand or available falls to this point, an order for 1,800 pieces should be placed, provided there has been no change in the market price or the conditions affecting the consumption of the item.

In explaining his formula, the author said:

> The above method is no substitute for the judgment and experience of purchase executives, but a tool which will make such judgment and experience more effective. There are many factors in the work of purchasing which cannot be evaluated quantitatively. Differences in the character and capacity of vendors may affect the executive's decision materially. Similarly, the vendor's location and ability to deliver when wanted must be considered. At times, price considerations may be inferior to quality or delivery. The advantage of price reductions for quantity purchasing can be studied by means of the formula. . . . While these and other factors affect the solution of the problem, the formula should assist greatly in the work of purchasing those materials and supplies which are being used constantly.

The purchasing officer of the Pierce Storage Battery Company had been trained as an engineer and had been employed in the company's production department prior to his appointment as purchasing officer. He was familiar, therefore, with the use of certain formulas designed to assist engineers in determining the most economical lot to manufacture and had been impressed with their value. Being anxious to perform his duties as efficiently as possible, he seriously considered utilizing the foregoing method in determining the proper amounts to order.

He contemplated trying it out in connection with purchases of cotton linters and paper, because he could more easily determine storage charges on these two articles. However, he had considerable difficulty in getting the necessary data; he found that he could not get exact storage costs and that any figures for deterioration or obsolescence were little more than guesswork. Nevertheless he finally collected the following figures:

Cost per order for company	$1.60
Interest charge	6%
Cost per usable square foot per year for storage	$0.30

	Cotton linters	Paper
Annual consumption	4,000 bales	50 reams
Number of square feet for storage	8 per bale	⅙ per ream
Deterioration and obsolescence per year	5%	5%
Price	$9.25 per bale (in carload lots of 100 bales)	$4.80 per ream ($4.30 in case lots of 25 reams)
Average quantity purchased in the past	300–400 bales	5 reams

The purchasing officer was undecided as to the extent to which he should rely upon this formula, particularly since he had learned that most purchasing officers were extremely skeptical of the value of any formula designed to determine mathematically the most economical lot to order, preferring to rely upon their own judgment based upon past experience.

32. DETROIT EDISON COMPANY (A)

SALE OF SCRAP COPPER

In January, 1931, the manager of the salvage sales division of the Detroit Edison Company requested bids on 75,000 pounds of baled copper, No. 1 grade. On the day the bids were received the copper market was weak, and the question arose as to whether or not to reject all bids. If they were not rejected, a further consideration was the question of to whom to sell the copper.

The Detroit Edison Company was a large public utility, supplying electric power and central heat to the city of Detroit and the surrounding territory. The work of salvaging and disposing of scrap, used and surplus material, and used equipment was carried on jointly by a division of the stores department and by the salvage sales division of the purchasing department. The executives of the company believed that the stores department was best able to collect and prepare all salvage, because it maintained warehouses in all parts of the district, operated the company trucks, was familiar with the materials used by the company, and was generally responsible for inventory control. A salvage engineer worked under the head storeskeeper and in cooperation with the salvage sales division. He surveyed materials that were to be salvaged, investigated to determine why materials had to be salvaged, and supervised the preparation of the material in accordance with instructions from the salvage sales division.

Since the executives of the company believed that the purchasing department was in the best position to know who were the buyers of scrap, that department was responsible for the sale of all salvage. It was best situated to know and follow market conditions and it had contact with purchasing officers in other companies. The salvage sales division had the authority to specify how and when salvage material was to be prepared. This authority was essential in order to obtain the highest possible price. As a result of the adoption of systematic salvage operations which properly prepared and classified materials, salvage sales had increased from $200,000 in 1924 to $1,250,000 in 1930.

All salvage items were classified under the following major divisions: (1) scrap metal, cable, rubber, rope, paper, burlap, rags, etc.; (2) by-products, such as cinders and tar; (3) new, used, or surplus equipment; (4) stock material.

All scrap metals and other types of scrap were segregated into classes designed to bring the highest revenue. However, care was taken that the expense of classification did not amount to more than the additional revenue to be received. In general all scrap material was sold on a competitive basis to the highest bidder. In order to be eligible to bid for scrap, a company or individual was expected to be on the "approved list of bidders." Before being admitted to this list, a firm or individual was subject to a strict investigation as to financial stability, integrity, and fair dealing.

When scrap was to be sold, bid forms were sent out to firms or individuals on the approved list who purchased the type of scrap to be offered. These forms showed the kind of material to be sold, its grade, the quantity, its location, and the hour and day on which the bids would be closed. Three days were usually allowed between the date the requests for bids were sent and the time of closing. This period was considered ample time for local bidders to inspect the material and submit a bid. When bids were requested from out-of-town bidders, more time was allowed. After the signed bids had been received, they were tabulated on a summary sheet and award was made to the highest bidder for each class of material. An example of a form frequently used as a notification of an award of contract for scrap materials is shown in Exhibit 1.

A sales order was issued for every sale of material. This order was made out in quadruplicate. The original was retained for the salvage sales division's file, the duplicate and triplicate were sent to the warehouse where the material was located, and the quadruplicate was sent to the stores department. The exact quantity delivered to fill the order was noted on the duplicate by the warehouse storeskeeper, and the duplicate order then was sent to the stores department. After the stores department had recorded the quantity delivered, the duplicate sales order was sent to the tabulation bureau of the accounting department, where it was posted to the stock record, and then sent to the general bookkeeping division, where an invoice was issued and sent to the purchaser. A copy of the invoice was sent to the salvage sales division as evidence that the material sold had been

PURCHASING DEPARTMENT

Inquiry No.

Gentlemen:

The following scrap materials have been awarded to you at the prices offered by you on my inquiry No..............., subject to all the conditions stipulated herein and on the inquiry sheet.

QUANTITY	DESCRIPTION	POINT OF SHIPMENT	PRICE

TERMS (Read Carefully)

CONDITIONS: Shipping directions must be received in this office within five (5) days from date of award. Award will be made only in the expectation that there will be available for sale the material it calls for within thirty (30) days from its date. If no such material is available within the period mentioned and this Company shall be the sole judge as to whether there is or is not, then the award shall be considered cancelled and no liability against this Company on account thereof shall attach. In the event of material being available, shipment will ordinarily be made within thirty (30) days after receipt of shipping directions.

SHIPMENTS: Deliveries to be made F.O.B. our tracks at point specified. Current tariff switching charges will be made for delivery to connecting lines. So far as reasonable and conveniently possible, shall be made in units of not less than the minimum carload lots and when a substantial fulfilment of a sales order leaves an unfilled tonnage balance of less than the minimum carload, the shipping and sales obligation will be considered completed.

RECONSIGNMENTS: Commercial tariff to govern on shipments reconsigned in transit or at destination. Car Service Association rules to govern.

TERMS: Sight draft attached to bill of lading. Our classification and track scale weights at point of loading to govern.

If any claims are made, we will investigate, but no claims for scale variations of less than 1,000 lb. will be considered and no charge will be considered where the amount involved is less than TEN DOLLARS.

Please send your shipping directions to conform with above terms of sale.

....

PURCHASING OFFICER

EXHIBIT 1.—Detroit Edison Company. Notification of award of contract for scrap materials.

billed. This copy of the invoice, all the bids received, and the summary sheet on which the bids were tabulated were filed together as the completed record of the transaction.

Records of payment were kept by the salvage sales division in a loose-leaf book which had a special sheet for each class of material. The sales order, date of sale, description of material, price, and amount were posted on the proper sheets. In the same record book there was also a sheet for each firm to which sales had been made. These sheets, which were kept alphabetically, contained information about each sales transaction, showing the amount which the firm had purchased, date of the transaction, sales order number, description of material, price, and amount. Yearly summaries were compiled from this record.

Under normal conditions, Detroit, largely because of the demands of the industrial companies supplying the automobile industry, was a good market for all types of scrap metals. In 1930, however, because of the depression, scrap was not in normal demand.

Early in the fall of 1930 the manager of the salvage sales division had sent out requests for bids on 75,000 pounds of No. 1 grade baled copper. This copper had been salvaged from weatherproof wire which had been taken down in the reconstruction of overhead lines. The insulation had been burned off and the remaining copper was of very high grade. Before bids were received, the copper market weakened; and that situation, in conjunction with the subnormal market for scrap, resulted in a set of bids which the manager thought were too low to accept. The manager received daily reports on the copper market from the research division of the purchasing department. An opportunity was given the various bidders to revise their bids; since no higher bids were received, however, all were rejected. Bids were requested at two later dates, and on both occasions the results were similar.

In the early part of January, 1931, the manager of the salvage sales division decided to make another attempt to dispose of the copper. In general he believed that it was good policy to keep scrap material moving, thus preventing capital from being tied up, keeping the salvage warehouse and storage yard from becoming overcrowded, and furnishing a smoother flow of work for the salvage division.

The January report concerning the copper market, prepared by the purchase records and research division of the purchasing department, summarized the copper situation as follows:

> While the copper market continues in a weak position statistically, there are indications that this industry is putting its house in order. For the first time in months, production has been reduced to such an extent that more copper is being used than produced. This condition must prevail for some time in order to put the copper market in a strong position statistically, but apparently the start has been made.
>
> Over a period covering several decades the use of copper has increased at a nominal yearly rate. While the years 1928 and 1929 witnessed consumption in excess of this normal rate, shipments during 1930 were considerably below the average growth line. If we take as an original premise that the commodity copper will continue to hold its position as a necessity to industry, we can assume that consumption during 1931 and 1932 will be of such a volume as to continue the curve of consumption close to the normal growth line. That is, copper consumption will have to increase enough above normal to compensate for the curve valley of 1930.
>
> However, there is no statistical reason for strength in the copper market in the immediate future.

On January 6, requests for bids were sent out to five firms: two scrap brokers, Brown and Son and Abel Brothers; two smelters, the Universal Smelting Company and the National Smelting Company; and a manufacturing company, the Specialty Casting and Forging Company. Because the manager of the salvage sales division believed in developing the local market whenever possible, only local companies were requested to submit bids.

The salvage sales manager followed a general policy of awarding only as much business to a scrap broker as he considered that the broker was able to finance. As a result of conditions existing at the time, he believed that it would be unwise to award more than half of the 75,000 pounds of copper to either of the brokers. He also believed that, since the goodwill of the local smelters was a valuable asset in disposing of a variety of scrap materials, he should award them some business whenever possible.

The following bids were received:

	Cents Per Pound
Brown and Son	8.61
Abel Brothers	8.55
Universal Smelting Company	8.50
National Smelting Company	8.25

A price of 8.61 cents per pound net could have been received from a copper refinery in New Jersey.

On the day that bids were received the price of new copper was weak, having dropped from 10.50 cents to 10.25 cents per pound. The manager of the salvage sales division believed that, if industrial activity improved in the spring, copper would move to higher prices and scrap prices would be more than proportionately higher.

33. BRISCOE COMPANY

DISPOSITION OF SCRAP

The Briscoe Company was a small drop-forging plant located in an Ohio industrial town. In July, 1938, the Ajax Foundry Company, located in the same town, requested that the Briscoe Company become its source of supply for brass scrap. Usually the Briscoe Company sold its scrap to its brass supplier in lots of at least 10,000 pounds. The scrap prices published by the brass companies offered an extra ½ cent a pound for brass scrap available in such quantities. Two or three months were normally required for the Briscoe Company to accumulate 10,000 pounds of brass scrap. Since the Ajax Foundry Company wished to pick up the scrap at frequent intervals, it could not be accumulated in 10,000-pound lots and the Briscoe Company would not receive the higher price. The president of the Briscoe Company was, therefore, undecided as to whether he should grant the request of this customer.

The Briscoe Company was well known for the excellence of its forgings.[1] In addition to operating the usual furnaces and drop hammers for forging steel, the company in 1934 purchased a large press which enabled it to forge parts from brass in competition with the large brass companies. Partly as a result of aggressively utilizing the wider market made available by this new equipment, total annual sales, which had dropped from $750,000 in 1929 to $75,000 in 1932, increased to nearly $700,000 in 1937.

In quoting prices on its new business, the Briscoe Company followed the prices set by the large brass companies. Each of these companies published price sheets which not only contained the price of brass per pound when in such commercial shapes as rods, bars, and sheets, and the price which the companies would pay for brass scrap, but also presented a formula for determining the price per pound for brass forgings. Using these price lists in quoting prices to its own customers, the Briscoe Company had been successful in building up a substantial volume of profitable business in brass forgings, although in 1937 these sales represented less than 40% of the company's total volume.

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[1] Forgings and castings were in competition. Castings were made by pouring molten metal into a core, while forgings were produced by pressing or hammering red hot metal into the shape desired. The former were cheaper but usually produced parts of less strength than forgings.

In January, 1938, the Briscoe Company received from the Ajax Foundry Company, from which it previously had never had any business, a request for a quotation on 100,000 special bolts to be forged from brass. A considerable portion of the business of this foundry had consisted of brass castings for a particular type of bolt which was the basic part of a special safety device used in public buildings in a certain large metropolitan city. Because brass castings had been shown to be of insufficient strength, the authorities in this city had issued an ordinance requiring that all these bolts must be of forged brass.

Prior to this ordinance, the Ajax Foundry Company had been making the bolts for one of the three large building contractors in the city who were licensed to install the safety devices. For years the Ajax Foundry Company had had a particularly close relationship with this contractor. Although it did not have the equipment necessary to forge the bolts, this company could still machine them. Rather than give up business which might still be profitable, the foundry planned to buy the forgings. The Briscoe Company appeared to be a desirable source of supply since it was located in the same town and had the equipment necessary to produce forgings in accordance with the rigid specifications given in the city ordinance.

The Briscoe Company quoted a price on 100,000 forged bolts, basing its price on the information given in the price lists published by the brass companies. In addition the company added a charge to cover the extra care necessary to insure compliance with the rigid specifications, as the Briscoe Company was required to assume full responsibility for the soundness of the forgings. Because of the greater resistance to weather, the Briscoe Company also suggested the use of a brass containing 1½% nickel. Both this suggestion and the quotation were readily accepted, and the foundry placed an initial order for 50,000 forgings, a second 50,000 to be ordered subsequently.

In buying the raw material to fulfill this order, the president of the Briscoe Company found that there was a saving of a fraction of a cent per pound if he ordered over 30,000 pounds at one time. Since the order for bolts would require roughly 50,000 pounds of brass, he immediately placed an order for this amount with his regular supplier at a price of 14.75 cents per pound. This price was 1 cent higher than the cost of the brass he usually purchased. Brass scrap at that time was quoted at 6.25 cents per pound in quantities in excess of 10,000 pounds. Since scrap in manufacturing these bolts would amount to 40% of the raw material used, the president estimated that the return from brass scrap would approximate $1,250 for each 50,000 forgings, making a net raw material cost of $6,125. The normal scrap allowance for forgings made with drop hammers and with presses was 36% and 15% respectively.

In July, 1938, shortly after the initial order had gone into production, the foundry company requested that the Briscoe Company sell it all the scrap that accumulated in the manufacture of these bolts. This scrap the foundry intended to use in its own production of castings. Since the foundry wished to collect the scrap daily with its own trucks, it offered to pay 5.75 cents per pound, the market price for brass scrap in quantities of less than 10,000 pounds. This price was to remain in effect until the 100,000 bolts were finished.

The president of the Briscoe Company decided to accept this offer. He reasoned that the Briscoe Company would not be receiving a reduction in its return from scrap of more than ¼ cent per pound. If brass was collected for shipment to the brass supplier, it would be necessary to purchase additional barrels at a cost of 75 cents each for every shipment, since the barrels would not be returned to the Briscoe Company. Each of these barrels could contain from 200 to 400 pounds, depending on the shape and size of the pieces of scrap and the care with which they were packed. If the scrap was sold to the Ajax Company, it would be possible to re-use the barrels, since they would remain in the possession of the Briscoe Company. In addition, much of the work of handling the scrap would be done by employees of the foundry who would themselves load the barrels into the foundry's truck. The work of sorting the scrap would in either event be done by the Briscoe Company. Most purchasers of scrap, and particularly the brass companies, required that the various kinds be separated into barrels which were labeled as to the character of their contents. The president estimated that the cost of barrels and the expense of loading the scrap into freight cars totaled ¼ cent per pound. This expense could be saved under the arrangement with the Ajax Foundry Company. Since at the most 40,000 pounds of scrap were involved, he believed that scrap receipts to the Briscoe Company would not be reduced in excess of $100, computed as follows:

Total scrap, in pounds	40,000
Net reduction in return from scrap, in dollars per pound	$0.0025
	$100.00

In addition, since the price offered for the scrap by the Ajax company was to remain in effect until the bolts were finished, the president of the Briscoe Company would avoid any danger of a sharp drop in the price of scrap. By the terms of his contract with the brass supplier, he was protected against changes in brass prices. The return which he received on his sales of scrap was set, however, by the price of scrap as of the date it was shipped to the brass company. Normally prices of brass and brass scrap varied proportionately. Brass prices were regulated to a large extent by the market price of electrolytic copper, and the price of scrap bore a direct relationship to the amount of recoverable copper which it contained. Brass prices, however, were also conditioned upon market prices for lead and zinc, which were the most common alloying agents. In instances in which the prices of these alloying agents were out of proportion to the price of copper, brass prices might vary from their normal relationship with prices of scrap. For the period from January 20 to July 29, the president of the Briscoe Company had listed the quoted base prices for brass rods and brass scrap and the base price for brass forgings, as shown in Exhibit 1. He noted that throughout this period prices for these

EXHIBIT 1
BRISCOE COMPANY
Brass Prices, January 20 to July 29, 1938
(Base prices in cents per pound)

Date	Brass rods	Scrap	Forgings
January 20	12⅞	5⅝	20⅞
January 28	12⅝	5⅜	20⅝
March 14	12⅜	5⅛	20⅜
May 20	11⅝	4⅜	19⅝
July 5	12⅜	5⅛	20⅜
July 25	12⅝	5⅜	20⅝
July 29	12¾	5½	20¾

materials had tended to move in a reasonably constant relationship, and he knew of no reason to expect an unforeseen drop in scrap prices out of relation to the price of brass rods. Selling his scrap to the foundry, however, would eliminate any chance of his receiving an abnormally low return on his sale of scrap.

Although the order for 100,000 brass bolts totaled only $20,000, the president of the Briscoe Company knew there were over 8,000,000 bolts to be replaced, a share of which he expected would be purchased from the Ajax Foundry Company. The production of those bolts that were already completed by the Briscoe Company had revealed that this business was highly profitable. In actual production the company was making an unforeseen profit from two types of savings. First, the price that had been quoted on these bolts was based on an over-all length of 9 inches. When the order for bolts was actually received, it was found that almost half of them required lengths from 2 inches to 4 inches shorter with a corresponding reduction in necessary raw material. In addition, the president discovered that no additional expenditure was necessary to insure full compliance with the specifications. Since there had been an allowance in the original quotation for such expense, this saving was also a source of profit to the company. The balance available, after all expenditures for direct labor and materials necessary to complete the 100,000 bolts, was, upon investigation, found to be sufficient to cover total overhead costs incurred by the company in all its operations during the three-month period that the 100,000 bolts were in production. Because of the extremely profitable nature of this business, the president of the Briscoe Company decided to accede to his customer's request for scrap rather than jeopardize the assurance that his company would receive the order for the second lot of 50,000 bolts and also whatever future business might arise.

In September, 1938, after the 100,000 bolts had been completed, the Ajax Foundry Company suggested that the Briscoe Company continue to be its source of supply for brass scrap, the kinds of scrap, however, not to be limited, as in the previous agreement, to the scrap created in the manufacture of the 100,000 special bolts. The foundry company offered to pay at all times the published market price for quantities less than 10,000 pounds. It would pick up the scrap as required with its own truck and pay the then current market price.

Many of the arguments which had led the president of the Briscoe Company to sell the special scrap to the foundry applied to this new request. He hesitated, however, for four reasons.

First, the foundry was essentially a competitor. Castings, whether of brass or steel, were always a logical alternative to forgings of similar material. It appeared that the Briscoe Company was becoming a source of supply for a competitor who otherwise would have had to depend on local scrap dealers who might or might not have sufficient quantities to take care of his requirements.

Second, there was no assurance that the foundry would be prepared regularly to take all the scrap of the Briscoe Company. The scrap that remained would have to be sold to either scrap dealers or the brass companies, probably in quantities of less than 10,000 pounds. The cost of handling small quantities was almost as much as the cost of handling scrap in 10,000-pound lots. Unit barrel cost remained the same. The overhead expense of arranging for a purchaser was the same whether the quantity involved was 1,000 pounds or 10,000 pounds. Arranging for shipment to the brass companies was a simple routine as it had been the company's custom to ship its scrap in the railroad car in which its purchases of brass had been delivered. Such shipments of scrap were f.o.b. the Briscoe Company's plant. If the quantities were less than 10,000 pounds, however, it was probable that the brass companies would not be interested. If the Briscoe Company waited to accumulate larger quantities, it probably would have to wait from four months to six months, since only with difficulty could large quantities be accumulated if the foundry were constantly drawing upon the company's supply of scrap.

The brass companies were believed to accept shipments of brass scrap largely as a valuable service to most users of commercial brass. If it were not in a position to utilize this service offered by the brass companies, the Briscoe Company would be forced to depend upon local scrap dealers. Such dependence was undesirable, since the management of the Briscoe Company believed not only that scrap dealers were unreliable, but in addition that considerable time would necessarily be consumed in asking for quotations from the various local scrap dealers and in permitting them to examine the scrap that was for sale. In transactions with local scrap dealers, prices were determined not by the quoted price list used by the brass companies, but rather by the scrap dealers' ability to arrange for sale of the scrap either to a single purchaser or to several.

Third, the reduction in income from scrap that was involved amounted to somewhat over $250, computed as follows:

Total scrap per annum, in pounds	100,000
Net reduction in return from scrap, in dollars per pound	$0.0025
	$250.00

The Briscoe Company was not in a position to suffer, for the sake of a foundry which was a competitor as well as a customer, a loss of these proportions.

Fourth, the dies for making the bolts were still in the possession of the Briscoe Company. It had been the experience of the Briscoe Company that, because of sheer inertia and the difficulty of converting dies to fit different forging equipment, there was a definite sales advantage to the company which had possession of customers' dies, even though the dies had, according to trade practice, been paid for by the customers and could be demanded by them at any time. The Briscoe Company had over 2,500 dies in stock, most of which were owned by its customers. Because the dies for making the bolts were still in the possession of the Briscoe Company, and because the first order for 100,000 had proved to be satisfactory, the Briscoe Company might still retain the business of the Ajax Foundry Company even though it refused the request to sell that company its scrap.

34. SIMROCK METAL PRODUCTS COMPANY

SEPARATION OF SCRAP INTO PREMIUM CLASSIFICATIONS

The Simrock Metal Products Company manufactured electric and ice refrigerators; oil, gas, and electric ranges, stoves, and heaters; kitchen furniture; steel filing cabinets; and a variety of small metal products, such as kitchen utensils and ash trays. The basic operations performed by the company in the production of each of these items were cutting and shaping sheet metal, principally steel. Disposing of the scrap metal which resulted from these operations was a duty of the purchasing officer. Early in 1939 the purchasing officer was considering what savings would result from a better separation of the scrap into premium classifications.

The principal varieties of metals purchased by the Simrock company were the following:

1. Hot-rolled and cold-rolled sheet and strip steel, used for stampings and drawings.
2. Cold-rolled pickled sheets, used for stampings that were to be finished with a thin coating of baked enamel.
3. Vitreous enamel iron, used where high-grade baked enamel surfaces were required.
4. Chrome steel, used in the manufacture of rust-resisting parts for oil stove heater units.
5. Pig iron and iron scrap, used in the company's foundry in casting such parts as stove grills.
6. Tin and terne plate, used on inexpensive stampings.
7. Copper, brass, and aluminum, used in manufacturing certain types of stampings.

The principal operations performed on these materials were grouped into three classifications: (1) cutting and shaping sheet metal on shears and punch presses; (2) treating, painting, plating, or enameling the shaped metal parts; and (3) assembling the parts into complete units. These parts consisted of both those manufactured in the company's plant and those which were purchased from outside suppliers. The former were all shaped metal pieces, while the latter were largely wiring materials, hardware, electric motors and switches, compressors, thermostats, gauges, thermometers, valves and other controls, parts molded from bakelite and plastics, and insulating fabrics and materials.

The scrap that resulted from these operations was composed of five principal types: (1) skeleton sheets, which were sheet and strip metal from which shapes or "blanks" had been punched, the remnant being left in one piece; (2) shearings, which were narrow strips trimmed from sheets cut to size; (3) punchings, which were the small pieces of metal produced when holes were punched in sheet or strip metal; (4) waste blanks or large punchings of various shapes and sizes, which resulted from the punching operations; and

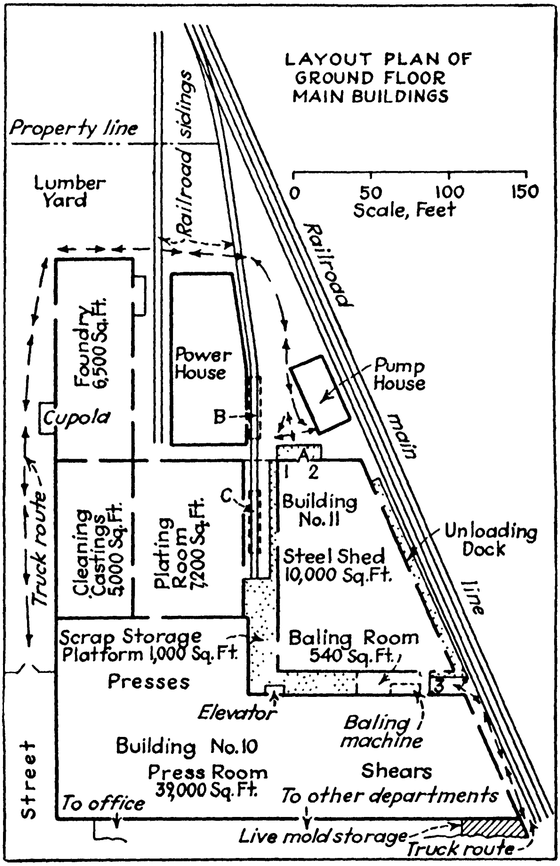

EXHIBIT 1.—Simrock Metal Products Company. Layout plan.

(5) stampings which had been rejected as not up to quality or dimensional specifications, and which could not be re-used. These rejected stampings largely resulted from test runs made in the course of setting up a die. They might, however, also be caused by the defective operation of a machine or by improper insertion of material by a worker.

Most of the scrap resulted from the operation of two principal classes of machines, shears and presses, both of which were located in a large room on the ground floor of the company's main building. The location of this room is shown in Exhibit 1. In this room, the company operated 60 presses and 14 shears and employed 200 men. Beside each machine stood a barrel or a wheelbarrow into which the worker tossed scrap. As the scrap accumulated in each receptacle, a worker known as a sweeper emptied it into his wheelbarrow. The sweeper had no definite schedule of collection and followed no particular route among the machines; it was simply his duty to prevent scrap from piling up so as to obstruct the operation of a machine.

The sweeper was responsible for keeping the scrap separated by types of material. This job was relatively simple, as the scrap was separated into only six readily distinguished classifications: ferrous,[1] chrome, tin and terne plate, brass, copper, and aluminum. The ferrous scrap amounted to over 1,000 tons[2] a year, while it was unusual for any of the other classifications to exceed 40 tons a year, even in years of volume production. Since 1929, for example, the brass, copper, and aluminum classifications together had totaled 15 tons or over only in the years 1936 and 1937.

Not only was the task of separating the scrap simplified by the high proportion of ferrous, but in addition the other classifications were readily identified. The distinctive colors of brass, copper, and aluminum, the blue-white color and high polish of chrome, and the thin gauge, finish, and color of tin and terne plate made separating these types of scrap from the ferrous relatively simple. Furthermore, as the receptacles at each machine were not large, they were emptied frequently, and the kind of material being worked at an individual machine was not changed very often during the day. As a result the sweeper usually found only one of the six classifications of the scrap in a receptacle. If a machine was operating on short runs, or if a change in material was made before the receptacle was full, the sweeper might find two or, at the most, three classifications of scrap in the receptacle. Even under these circumstances, separation was not difficult, because the scrap tended to fall in distinct layers and because, as a rule, the size and shape of the pieces varied for each classification, particularly when scrap consisted of large blanks, skeletons, shearings, and defective stampings. Some difficulty occurred when the scrap consisted of small blanks and punchings. Under these cirumstances, a certain amount of mixing was inevitable and, partly for that reason, scrap sold in the form of punchings brought low prices.

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[1] Throughout this case the term "ferrous scrap" refers to scrap from hot-rolled and cold-rolled sheet and strip, pickled sheets, and vitreous enamel iron sheets.

[2] Scrap was sold on the basis of gross tons, amounting to 2,240 pounds each, while steel was purchased by the net ton, or 2,000 pounds.

After collecting the scrap from the receptacles at the machines, the sweeper moved it to designated locations. The brass, copper, and aluminum classifications were dumped on the ground in separate piles in the open space between the buildings housing the steel shed and the pressroom, as shown by the figure 3 in Exhibit 1. Tin and terne plate scrap and chrome scrap were deposited near the rear door of the steel shed, as indicated in Exhibit 1 by the figures 1 and 2. Ferrous scrap was piled along the walls of the baling room.

Of the six important classifications of scrap, only ferrous was prepared for sale; the others were sold in small lots to a local scrap dealer. Brass, copper, and aluminum scrap, for example, was collected in truckload lots by the dealer for resale in carload lots to the principal manufacturers of each type of metal. The prices paid by the dealer closely approximated the less-than-carload-lot figures published weekly by these manufacturers. Higher prices were always quoted on scrap in large lots. Any brass company, for example, was willing to pay ½ cent a pound above the less-than-carload price for railroad shipments of 20,000 pounds, which was a minimum carload for all types of scrap. The less-than-carload prices on brass ranged from 4 cents to 6 cents per pound. The purchasing officer was unable to take advantage of the higher prices paid for carload lots, because the quantities of brass, copper, and aluminum scrap were relatively small, as shown in Exhibit 2, and because total storage space for these types of scrap at the Simrock company's plant was limited to a maximum of about 3 tons.

Unlike the brass, copper, and aluminum classifications, tin and terne plate scrap was of little value. No manufacturer of plate would buy the scrap, and the pieces were of such random sizes and shapes that no fabricator could use them to advantage.

EXHIBIT 2
SIMROCK METAL PRODUCTS COMPANY
Brass, Copper, and Aluminum Scrap Sold, 1929–1938
(In pounds)

Year	Scrap
1929	32,309
1930	29,391
1931	19,376
1932	22,742
1933	24,359
1934	22,266
1935	27,844
1936	37,251
1937	32,287
1938	20,568

The scrap dealer was willing to take this scrap, as he could sell it to various foundries producing such low-grade iron products as window weights. Because prices were so low, however, that the return to the dealer barely compensated him for his handling costs, the Simrock company was forced to give him the scrap.

Chrome steel, both in the form purchased by the Simrock Metal Products Company and in the form of scrap, was a valuable material. In 1938 the company paid a net price of 27 cents per pound for chrome steel, and it sold the scrap to its dealer in small lots at prices ranging from $20 to $25 per ton. The prices of chrome scrap were exceedingly variable, as shown by the following figures for the prices received by the company from 1932 to 1938:

Year	Chrome Scrap Average Price Per Ton
1932	$ 5
1933 (first 6 months)	5
1933 (last 6 months)	20
1934	25
1935	30
1936	30–40
1937	40
1938	20–25

In the opinion of the purchasing officer, the principal explanation for these fluctuating prices was that the dealer had been able to develop only a thin market for the scrap. The purchasing officer understood that the dealer sold most of the chrome scrap to only one customer and that the prices which he quoted were conditioned almost wholly upon the extent of the need of this one customer.

In order to develop a broader market for his chrome scrap, the purchasing officer, in the summer of 1938, had asked his source of supply for chrome steel what companies would be logical customers. The steel supplier suggested 16 concerns which might be interested, to each of which the purchasing officer wrote.

EXHIBIT 3
SIMROCK METAL PRODUCTS COMPANY
Sales of Chrome Steel Scrap, 1932–1938
(In gross tons)

Year	Scrap
1932	38.7558
1933	23.401
1934	7 48
1935	4.439
1936	44.756
1937	32 488
1938	22.5068

Many of these replied that they were not interested in chrome steel scrap, but three manufacturers said that they could use the scrap in carload lots. The purchasing officer also corresponded with three large scrap dealers in New York City, who replied that they were in a position to dispose of chrome scrap in carload lots on a favorable basis. No definite prices were quoted by any of the concerns which replied.

As shown in Exhibit 3, only limited quantities of chrome steel scrap, however, were produced by the company. In addition, its capacity for storing chrome scrap was confined to a normal maximum of about 6 tons, although an overflow onto the platform for storing ferrous scrap and into the aisles of the steel shed in a few instances had increased this maximum by an additional 2 to 5 tons. Because of these limitations in the quantities available and in the amounts that could be stored, the purchasing officer was unable to take advantage of the interest shown by the companies with which he had corresponded.

Ferrous scrap, after being collected, was taken to the baling room and hydraulically compressed into 110-pound bales, which were 16 inches by 16 inches by 24 inches. Some sort of bundling or baling was necessary, as the market for unbundled scrap from sheet and strip steel was very limited. The bales were then stored upon the scrap storage platform shown in Exhibit 1, the total capacity of which was about 73 tons. The baled scrap was sold in carload lots to the company's scrap dealer. The prices which he paid were based on those quoted in *Iron Age* for heavy melting steel scrap. For example, in November, 1938, the price, as shown in Exhibit 4, was $14.75 per ton at Philadelphia, the nearest basing point. Freight amounted to $4.85, making a net price of $9.90. As the Simrock company had no loading equipment, the scrap had to be loaded into the freight car by hand, a service for which the scrap dealer deducted 75 cents per ton; thus the final net price was $9.15 a ton.

EXHIBIT 4

Scrap Prices Quoted on Heavy Melting Steel—Philadelphia, 1937 and 1938

(Dollars per gross ton)

Month	1938 Weekly average					1937 Monthly average
	(1)	(2)	(3)	(4)	(5)	
January	$14.75	$14.75	$14 75	$14.75	....	$17.45
February	14.75	14.75	14.75	14.75	....	18.95
March	14.75	14.25	14.75	14.75	$14.25	20.15
April	13.75	13.75	13.25	12.75	....	20.25
May	12.25	12.25	12.00	12.00	....	18 90
June	12.00	12.00	12.25	12.75	....	17.45
July	13.25	13.25	13.75	14.25	....	18.85
August	14.25	14.75	14.25	14.25	14.25	19.75
September	14.25	14.25	14.25	14.25	....	19.00
October	14.75	14.75	14.75	14.75	....	16.40
November	14.75	14.75	14.75	14.75	....	13.75
December	14.75	14.75	15.25	15.25	15.25	14 15

Source: *Iron Age.*

An examination of Exhibits 4 and 5[1] will reveal some discrepancies in this method of computing the scrap prices received by the company. For example, the base price during both

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[1] See pp. 282–286.

February and November, 1938, was $14.75 a ton. In the former month, however, the net price paid by the dealer was only $8.25 a ton, as compared with $9.15 in November. There were three principal reasons for such discrepancies. First, the actual market price for the scrap at times varied somewhat from the estimates given in *Iron Age*. Second, when the scrap market was approaching conditions of oversupply, even though no actual weakness in prices had been reported, buyers of scrap were less ready to accept hydraulically baled scrap as heavy melting scrap. In other words, actual prices of sheet scrap, even though hydraulically baled, tended to fall somewhat in advance of any definite weakness in quotations on heavy melting scrap. Third, if a user of scrap needed a supply, he was often ready to pay somewhat above the market price to the dealer who could arrange for an immediate shipment.

Prior to January, 1935, the Simrock company had not had the equipment necessary to compress the scrap into bales. Before that date the scrap was bundled loosely on a hand-operated machine. This hand-bundled scrap, however, was so loose that the company received from $1.50 to $2 per ton below the full price for baled scrap. The purchasing officer for some time had insisted that the company should procure a hydraulic baler. The necessary equipment would cost from $3,000 to $5,000, but he believed the premium for hydraulically baled scrap would increase the company's return from scrap sales by nearly $1,000 a year. During the period 1929–1934, annual sales of ferrous scrap, as shown in Exhibit 5, regularly exceeded 500 tons, except in 1932, the poorest business year in the company's history. In 1933, for example, a relatively poor year, sales of this scrap exceeded 650 tons. The purchasing officer believed, therefore, that annual sales would continue to total at least 500 tons, and as the Simrock Metal Products Company's volume increased with improving business conditions, he expected the sales of ferrous scrap at least to be in excess of 600 tons annually. At a premium of $1.50 per ton, the sale of 600 tons of ferrous scrap would show an increased return of $900 a year.

This "saving" of $900 was not the sole way in which the company would profit by installing hydraulic baling equipment. Throughout the years 1929, 1930, and 1931, as shown in Exhibit 5, a certain amount of ferrous scrap was sold to the scrap dealer unbundled; it was sold in this form when the capacity of the hand-bundling machine was insufficient for the quantity of scrap accumulated, or when the machine was down for repairs. Lack of storage space forced the purchasing officer to move the scrap at regular intervals, even though the dealer paid from $1.50 to $2 less per ton for this unbundled scrap; the difference represented the estimated cost to the dealer of bundling the scrap at his own yard. In addition, if the ferrous scrap available was insufficient to keep the proposed baling equipment operating at capacity, tin and terne plate could be baled. For baled tin and terne plate, of no value if unbaled, the dealer had indicated he was willing to pay at least $1.70 per ton, which was approximately the cost per ton to the Simrock company for baling the scrap.

These arguments and the additional fact that the maintenance cost of the hand-bundling machine was amounting to $1,000 a year led the management of the Simrock company, late in 1934, to look into the matter of buying hydraulic baling equipment. It was the company's usual policy to buy equipment only when the savings involved, conservatively estimated, would return the cost of the investment in at least three to five years. Exceptions to this rule were not uncommon, but generally had to be justified by some special circumstances. In the case of the baling equipment, the purchasing officer's estimate of savings of $900 a year was accepted as conservative.

Through an industrial machinery distributor, equipment was found that could be purchased for $2,594.70, f.o.b. the Simrock company's plant. The press was practically new, having been used only for demonstration purposes at the distributor's showroom, and the 10-horse power motor which powered the machine was entirely new. Estimated expenses for building the foundation, for cutting a doorway into the scrap room (the existing baling room shown in Exhibit 1), and for the purchase and installation of equipment for lifting, conveying, and weighing baled scrap amounted to an additional $605.30. The baling equipment had a normal capacity of 15 110-pound bales an hour. The factory superintendent, who was primarily responsible for all negotiations concerning the purchase of equipment, believed the power and direct labor cost of operating this equipment would not exceed the labor cost of the old hand-bundling machine. Also, since the equipment was in good condition, maintenance expenses should be at a minimum, considerably below the costs of repairing the old hand-operated machine.

The equipment was purchased in January, 1935, and installed at a total cost of $3,500; an appropriation of $300 in addition to the original $605.30 was necessary to cover labor and material costs during the installation.

The company shipped its first carload of hydraulically baled scrap on June 10, 1935. Thereafter, with the exception of one small load on June 19, all ferrous scrap was hydraulically baled, and the price paid to the company was based on the full price quoted weekly in *Iron Age* for No. 1 heavy melting scrap delivered at Philadelphia, less freight and the usual handling charge.

Soon after the Simrock company had purchased the hydraulic baler, the company's time study engineers established piece rates for the operations of baling the scrap and piling the bales on the scrap storage platform indicated in Exhibit 1. The operator's rate was set at $4.68 per 100 bales, the helper receiving $4.22. Optimum capacity was found to be from 130 to 150 bales per eight-hour day. Maintenance costs proved to be disappointingly high, as the equipment was apparently not heavy enough for the work. While the equipment rarely failed to operate, it was rebuilt once a year and minor repairs were made at rather frequent intervals. By 1939 the company had spent over $1,000 on repair work since putting the equipment into operation.

As shown in Exhibit 5, the company's sales of ferrous scrap increased from 886 tons in 1934 to 1,574 tons, an all-time high, in 1936. Even in the relatively poor year of 1938, sales were in excess of 1,100 tons. Handling and storing scrap in these quantities put a further strain upon the company's facilities, which had been somewhat inadequate even in 1934. The tightly compressed bales produced by the hydraulic press made possible an increase in the quantity that could be stored from about 50 tons to approximately 70 tons. When the scrap on hand amounted to 70 tons, however, it was essential that the purchasing officer arrange for its sale to the dealer, even though market conditions favored delay.

Since the purchasing officer did not follow a policy of speculating on raw material or scrap prices, the necessity for prompt sale of baled scrap was not in itself a serious handicap. The lack of space made it difficult, however, for the purchasing officer to convince the management that vitreous enamel iron scrap should be separated from ferrous scrap. Vitreous enamel iron was iron of very high quality, and the scrap dealer was willing to pay a premium of $3 per ton for it.

The purchasing officer did not know what proportion of the tonnage of ferrous scrap was enamel iron. He did, however, have figures for the total quantity of ferrous metals, hot-rolled and cold-rolled sheets and strip, pickled sheets, and vitreous enamel iron, used annually in manufacturing the company's products and the proportion of that total which consisted of enamel iron. These figures were as follows:

Year	Ferrous metals consumed, in tons	Percentage of vitreous enamel iron.
1934	9,350	35
1935	11,550	37
1936	16,500	41
1937	14,800	37
1938	12,300	39

Ferrous scrap had normally amounted to 9% or 10% of the total quantity used. Enamel iron scrap would probably amount to a somewhat lower proportion of the quantity of this metal consumed, possibly 7% to 8%. Assuming that 10,000 tons of all metals in the ferrous classification was the minimum annual consumption and that at least 35% of this total was enamel iron, the purchasing officer estimated that a minimum of 245 tons of enamel iron scrap would be available each year. If sold at a premium of $3 a ton, this scrap would increase the returns from sales of ferrous scrap by $735 a year.

The purchasing officer knew, however, that separating enamel iron scrap from other kinds would involve various difficulties. Although separating the company's metal scrap into the six existing classifications was relatively simple, enamel iron scrap was not so readily separated from the other metals included in the ferrous classification. Though distinctly different from the scrap resulting from working hot-rolled sheets, enamel iron scrap was not easily distinguished from cold-rolled scrap. In particular, scrap from cold-rolled pickled sheets was almost identical in appearance with scrap from enamel iron. It was doubtful whether the most experienced steel operative could tell the two types of scrap apart. In drawing stock from the steel shed even the stock room employees depended largely on the identifying brand name which was stamped on each sheet of vitreous enamel iron. Without doubt, therefore, the sweeper would be incapable of distinguishing the vitreous enamel iron scrap.

The problem of separation was further complicated in that there were no distinct runs of enamel iron stampings. Often the stampings made from enamel iron and pickled sheets were identical in size and shape and were made from the same dies, on the same machine. In many instances the sole difference between an inexpensive and a high-price stove or refrigerator was the type of finish, the former being finished with a synthetic paint baked on pickled sheets and the latter having a heavy coating of enamel which could be baked only on vitreous enamel iron. As a result, there was no interval for setup between runs of the two types of material which were the most difficult to separate, and the contours of the skeleton sheets and the blanks which comprised the scrap were identical for each type.

It would be necessary, therefore, to keep the two types separate by some other means than the usual visual examination by the sweeper. The purchasing officer believed that instructions to keep vitreous enamel iron scrap separate could be appended to the route cards, which were the sheets giving the workers such information as the quantity to run and the material to work. If the workers received definite instructions in regard to enamel iron scrap, the die setter, in setting up the machine, and the worker operating the machine could inform the sweeper that a separate receptacle for enamel iron scrap was needed. Some sort of tag could then be attached to this receptacle for purposes of identification.

When the purchasing officer discussed his idea with production officials, he was informed that this proposal involved certain difficulties. All the workers in the pressroom were on a piece rate. Since handling and separating scrap was wholly the function of the sweeper and no allowance for scrap disposal was included in any of the piece rates, the workers were accustomed to tossing scrap indiscriminately into whatever receptacle was near. Further, experience had shown that even when specific instructions were placed on route cards, such instructions were not always followed.

In addition, enforcing any specific instructions necessarily was a duty of the foreman, who, particularly in rush times, was already burdened with the difficult problems of maintaining production schedules and had little time to follow closely the disposal of scrap. Some such check on the handling of enamel iron scrap was probably essential, however, as the scrap had to be almost entirely free of other metals in order to rate the premium of $3 a ton.

Storage of enamel iron scrap also presented difficulties. After viewing operations in the baling room, the purchasing officer decided that there was sufficient space in the baling room for a special bin in which the sweeper could dump the enamel iron scrap. Production officials to whom he broached this idea stated, however, that when the plant was operating at capacity, space in the baling room was insufficient to accommodate the quantities of unbaled scrap that accumulated. They believed that it would be impossible to delegate 30% to 35% of the already inadequate space as a bin for enamel iron. In addition, while enamel iron might average 35% of the ferrous scrap being produced, it was unlikely that this relationship would be maintained regularly. Furthermore, in order to store a carload of enamel iron scrap, in addition to a carload of ferrous scrap, it would be necessary to double the capacity of the existing storage platform.

In order to provide near the baling machine sufficient room for the special bin and in order to enlarge the space for scrap storage, extensive changes in the layout given in Exhibit 1 would probably be necessary. The scrap storage platform could be extended to the point indicated by the dotted line shown in Exhibit 1. This extension would nearly double the normal capacity and would involve only a low cost, probably not over $100 to $200. Extending the platform, however, would double the distance which scrap would have to be carried and would necessitate installing some sort of power-loading equipment. The head of the time study and methods department had already looked into this matter, and he reported that a crane magnet would cost about $700, plus installation expenses, which would bring the total cost to at least $1,000. In addition, during loading, the freight car would be in the position indicated by the letter *B* in Exhibit 1, effectively blocking the siding used for unloading coal at the powerhouse.

The purchasing officer, therefore, suggested building a platform above the existing scrap storage area. The new platform would be level with the roof of the steel shed and would cover the entire area up to the dotted line. The freight car would then be drawn, as at present, up to the position shown by the letter *C* in Exhibit 1 and would be loaded by gravity chutes through hatchways in the platform. The principal disadvantage of this plan was the expense of constructing a platform strong enough to carry 75 to 100 tons of scrap. Although no definite estimates had been made, the cost would probably be well over $3,000. While the cost of loading by this method would be much less than the 75 cents a ton which was currently paid to the scrap dealer, it would not approximate the negligible cost of loading by crane magnet, estimated by the purchasing officer at approximately 10 cents a ton.

There appeared to be only one method of obtaining the additional space about the baling equipment which was needed: that was to move the baling machine to another location. Just where the baling machine could be located was not known, but moving it to any location would cost at least $1,000, exclusive of the expense of making such additions to buildings or other changes as were necessary to provide sufficient room elsewhere. It was not feasible to add to the baling room at the expense of the steel shed, as already there was insufficient capacity for storing steel.

Neither the production officials nor the purchasing officer believed these difficulties were insurmountable if the savings which resulted from changes were commensurate both with the considerable expenditures necessary to enlarge the facilities and with the required changes in the established routines of production control. The purchasing officer, therefore, considered other savings which might accrue, in order to present his ideas to the management in the most favorable light. If additional storage space was provided, he believed, on the basis of his correspondence with users and dealers of chrome scrap, that he could sell that scrap in carload lots. If he could tap the wider market indicated in the correspondence, he believed the scrap could be sold for approximately $40 a ton, or a premium of nearly $15 a ton over the current price arrangement with his scrap dealer. While this differential might be reduced slightly if the dealer's price again rose to $40 a ton, the purchasing officer expected that he would always be able to sell the steel at prices considerably above those quoted by the dealer.

The Simrock Metal Products Company had begun in 1933 to use chrome steel in making the heater unit of the oil stoves in the upper price brackets. Chrome steel resisted the rust and corrosion which usually attacked the heater unit and at the same time, unlike ordinary 18-8 stainless steel, did not close the small draft holes when subjected to high temperatures. This high chrome (15% to 20%) steel was extremely expensive, the price in 1938 being 27 cents a pound. For that reason, the purchasing officer's own company, as well as various competitors in the oil stove industry, had experimented with stainless steel and other metals as substitutes. Up to January, 1939, no satisfactory substitute had been found, and the purchasing officer believed that during the next few years at least, his company would continue to have for sale not less than 20 tons of chrome steel scrap a year.

In addition to the savings which would result from the sale of chrome steel scrap in carload lots, the purchasing officer believed that over the next few years his company would use larger quantities of enamel iron. Each year a larger proportion of the refrigerators, stoves, and kitchen tables manufactured throughout the industry were sold with baked enamel rather than painted finishes. In 1933, for example, only de luxe refrigerators were sold with baked enamel exteriors, but in 1938 nearly all refrigerators on the market were finished in some sort of baked enamel. The same change had occurred in stoves and kitchen furniture. In 1938 almost without exception the tops of stoves and kitchen tables were finished in heavy baked enamel. If this trend continued, enamel iron might well comprise over half of the total quantity of steel consumed by the Simrock company annually. In that event the purchasing officer's original estimate of 245 tons of enamel iron scrap a year would be a serious understatement. Correspondingly, the savings would exceed $1,000 a year instead of the earlier estimate of $750.

As in the case of chrome steel, however, there was always the danger that a substitute might be found for vitreous enamel iron. In 1939 the Simrock company was already using pickled cold rolled sheets when a coating of baked synthetic paint was satisfactory, at a raw material saving of $5 to $6 a ton. Members of the Simrock company's research department had endeavored to substitute pickled sheets wherever a surface was finished with baked enamel, but were still unable to get so good an enamel finish as when using vitreous enamel iron.

There was the additional possibility, however, that baked synthetic finishes, which were readily applied to pickled sheets, might be sufficiently improved to replace baked enamel entirely. Many companies, particularly the leading manufacturers of synthetic finishes, were experimenting with synthetic substitutes for enamel finishes, but as yet no satisfactory product was on the market.

EXHIBIT 5
SIMROCK METAL PRODUCTS COMPANY
Ferrous Scrap Sold
1929–1938

Date	Gross tons	Net price per gross ton	Total value
1929:			
February 25	36.071	$7.615	$ 274.68
March 16	32.370	8.25	267.05
March 18	33.973	8.25	280.28
March 25	40.178U	5.00	200 89
March 26	4.203P	4.00	16.81
April 20	41.785	8.25	344.73
May 21	34.285	8.25	282.85
May 27	18.845U	5.00	94.23
May 27	2.667P	4.00	10.67
June 26	32.767	8.00	262.14
July 27	2.379P	4.00	9.52
August 7	30.044	8.00	240.35
August 7	31.339	8.00	250.71
August 7	10.491U	5.00	52.46
September 23	1.484P	4.00	5.94
October 7	41.651	8.00	333.21
November 1	32.276	7.50	242.07
November 6	19.642U	4.50	88.39
November 25	32.723	7.00	229.06
December 21	2.32U	5.00	11.16
December 21	30.133	6.50	195.86
December 24	29.330	7.00	205.31
Total	540.868		$3,898.37

U Unbundled.
P Punchings.

EXHIBIT 5 (*Continued*)
SIMROCK METAL PRODUCTS COMPANY

Date	Gross tons	Net price per gross ton	Total value
1930:			
January 21	28.618U	$4.50	$ 128.78
February 6	43 080	7.60	327.41
February 26	37.669	7.60	286 28
March 14	29.712U	4.50	133.70
March 27	37.008	7.60	281 26
May 8	36.071	7.10	256 10
June 19	28 537U	3.00	85 61
July 8	39.419	5.00	197 10
August 16	35.446	5.00	177.23
September 12	31.294	5.00	156 47
September 18	6.037	5 00	30 19
September 24	40.133U	3 00	120 40
September 25	31.428	5 00	157.14
October 25	39.508	5.00	197.54
October 31	18.437P	2.35	43 33
December 30	50.267	4 00	201 07
Total	532.664		$2,779 61
1931:			
January 23	19.821U	2.40	47.57
March 18	57.589	4 00	230 36
April 1	34 955U	2 40	83 89
April 15	45.446	4 00	181.78
May 15	46.339	3 50	162.19
June 15	29 9375	3 50	104 78
August 4	44.33P	0.75	33 25
September 25	48.839	2.25	109 89
September 29	50.178	2.25	112 90
October 5	25.433P	1 00	25.43
October 17	2.111	2 25	4.75
December 1	39.33	2.00	78.66
December 7	44.920	2.00	89.84
December 22	33 526	2 00	67.05
Total	522.7545		$1,332.34
1932:			
January 2	6.183	2.00	12.37
February 4	31 473P	1.00	31.47
March 25	49.4642	1.50	74 20
March 25	29.196P	1.00	29.20
August 17	78.638	0.30	23.59
October 20	73.5	0.30	22.05
Total	268.4542		$ 192.88
1933:			
January 25	1 carload*	2.00†	2.00
February 23	1 carload*	2.00†	2.00
March 15	1 carload*	2 00†	2.00
May 5	27.366	0.50	13.68
May 9	37.107	0 50	18.55

* Estimated 50 tons. † Per car.
U Unbundled. P Punchings.

EXHIBIT 5 (*Continued*)
SIMROCK METAL PRODUCTS COMPANY

Date	Gross tons	Net price per gross ton	Total value
June 7	42.678	$1.00	$ 42.68
June 19	24.687	1.50	37.03
July 6	13.544	1.00	13.54
July 14	24.598	2.00	49.20
July 22	24 643	2.00	49.29
August 10	19.776	3.00	59.33
August 17	20.357	3.50	71.25
August 23	28.125	3.50	98.44
August 30	9.687P	1.50	14.53
September 26	34.553	3.50	120.94
October 5	22.455	3.00	67.37
October 23	45 223	3.00	135.67
October 27	40.00	3.00	120.00
November 28	45.268	4.25	192.39
December 7	18.437	4.25	78.36
December 19	26.875P	1.00	26.88
Total	655.379		$1,215.13
1934:			
January 3	27.678	3.50	96.87
January 24	40 133	3.75	150.50
February 16	29 419	3.75	110.32
March 3	34.69	4 25	147.43
March 20	32.46	5.50	178.53
April 18	32 901	6.00	197 41
May 1	34.376	5 50	189.07
May 1	23.915	2.00	47.83
May 8	44.916	4.00	179.66
May 10	40.678	4.00	162.71
June 13	46.964	3.50	164 37
July 11	39.642	3.00	118.93
July 19	39.129	3.00	117.39
August 29	39.82	3.00	119.46
September 10	24.50P	1.00	24.50
September 17	32.5	3.75	121.88
October 5	38.839	3.00	116.52
October 12	38.392	3.00	115.18
October 27	37.053	3.00	111.16
November 15	46.651	3.00	139.95
November 21	23.62P	1.00	23.62
December 4	50.804	3.00	152.41
December 13	40.536	3.50	141.88
December 31	46.562	4.00	186.25
Total	886.178		$3,113.83
1935:			
January 31	60.18	4.50	270.81
February 7	19.706P	1.50	29.56
February 25	45.49	4.50	204.71
March 20	43.214	4 00	172.86
March 30	51.07	3.75	191.51
April 10	14.872P	1.00	14.87

P Punchings.

EXHIBIT 5 (*Continued*)
SIMROCK METAL PRODUCTS COMPANY

Date	Gross tons	Net price per gross ton	Total value
April 30	38.839	$ 3.50	$ 135.94
May 6	23.66	3.50	82.81
May 15	38.214	3.50	133.75
May 31	27.099	3.65	98.91
June 10	50.267	5.00	251.34
June 19	6.428	3.65	23.46
June 29	64.758	4.50	291.41
July 15	61.38	4.85	297.69
July 31	61.785	4.85	299.66
August 23	55.31	5.10	282.08
September 6	61.562	5.10	313.97
September 23	66.205	5.25	347.58
October 10	54.375	5.70	309.94
October 22	50.714	5.85	296.68
November 6	64.553	5.85	377.64
December 5	60.04	6.25	375.25
December 18	59.955	6.25	374.72
Total	1,079.676		$ 5,177.15
1936:			
January 23	52.678	6.25	329.24
February 14	60.178	6.25	376.11
March 2	48.66	6.25	304.13
March 16	57.589	7.00	403.12
March 31	61.312	7.00	429.18
April 15	63.482	7.25	460.24
April 27	58.973	7.25	427.55
May 15	54.777	7.25	397.13
May 27	43.304	7.25	313.95
June 22	66.295	7.25	480.64
June 22	30.045	7.25	217.83
June 26	69.062	6.00	414.37
July 16	65.082	6.00	390.49
July 27	65.535	6.00	393.21
August 22	64.777	6.50	421.05
August 31	59.643	6.50	387.68
September 18	57.991	6.50	376.94
September 30	62.366	6.50	405.38
October 8	70.804	6.50	460.23
October 13	59.644	9.00	536.80
October 19	71.473	9.00	643.26
October 31	64.732	9.00	582.59
November 20	73.973	9.00	665.76
November 29	68.348	9.00	615.13
December 8	69.553	9.00	625.98
December 16	53.883	9.00	484.95
Total	1,574.159		$11,542.94
1937:			
January 2	59.821	9.00	538.39
January 16	60.312	9.00	542.81
February 12	68.214	9.00	613.93

Exhibit 5 (*Continued*)
Simrock Metal Products Company

Date	Gross tons	Net price per gross ton	Total value
February 26	74.554	$ 11.00	$ 820.09
March 13	59.660	11.00	656.26
March 30	64.662	11.00	711.28
April 10	52.232	11.00	574.55
April 28	75.848	11.00	834.33
May 13	71.919	13.00	934.95
May 27	65.848	13.00	856.02
July 2	61.384	11.50	705.92
July 13	63.169	11.50	726.44
July 13	70.223	11.50	807.56
July 22	62.455	11.50	718.23
August 2	53.348	11.50	613.50
August 13	62.812	11.50	722.34
August 31	60.312	11.50	693.59
September 21	73.571	11.50	846.07
October 4	56.741	11.50	652.52
October 13	31.429	11.50	361.43
October 29	39.482	9.00	355.34
November 17	17.065	6.00	102.39
December 17	55.800	9.14	510.01
December 21	72.366	7.75	560.84
Total	1,433.227		$15,458.79
1938:			
February 15	58.57	8.25	483.20
March 2	62.630	10.14	635.07
April 7	63.437	8.39	532.24
April 20	47.375	8.65	409.79
May 18	62.59	7.15	447.52
June 8	44.72	6.44	288.00
June 30	81.06	6.40	518.78
July 22	81.997	7.15	586.28
September 20	63.114	8.65	545.94
September 27	50.91	8.65	440.37
October 1	51.804	8.65	448.10
October 6	57.930	8.65	501.09
October 12	47.633	8.65	412.02
October 13	43.768	8.65	378.59
October 21	47.455	8.65	410.49
October 27	48.973	8.65	423.62
November 7	51.964	9.15	475.47
November 15	43.571	9.15	398.67
December 9	55.758	9.15	510.19
December 20	58.125	9.15	531.84
December 31	45.089	9.15	412.56
Total	1,168.473		$ 9,789.83

SECTION V

SOURCES AND THE ASSURANCE OF SUPPLY

35. LAXLEY COMPANY

SUBSTITUTION OF MATERIALS

The Laxley Company manufactured a wide assortment of loose-leaf and bound blankbooks. Since 1934 it had been producing an inexpensive loose-leaf blankbook for the Payne Stores Corporation. Throughout 1937 rising costs of materials and labor made it increasingly difficult for the Laxley Company to make a profit on the production of this item. The executives were faced, therefore, with the problem of reducing over-all costs for this line, if the price to the Payne Stores Corporation was to be maintained. As a possible means of lowering expenses on these loose-leaf books, a change in the type of steel used in their manufacture was being considered in November, 1937.

The company contemplated replacing its traditional "satin-finish" steel strip with a more brightly finished steel which was being introduced on the market at this time by the Mildner Company, a supplier which recently had come to the attention of the Laxley Company. There were two reasons for thinking that this substitution of materials would reduce costs: the new material was offered at a price 14% below that being paid for the steel strip, and economies of processing might result from its use.

The Payne Stores Corporation, the company for which the Laxley Company manufactured this line of merchandise, was a large variety chain operating throughout the northeastern section of the United States. In buying merchandise for resale the chain computed its purchase price by subtracting from the retail selling price the gross profit which it normally expected to make. Several manufacturers were then asked to submit specifications for and samples of the merchandise which they would be interested in furnishing at the indicated price. From among the group which could sell to the Payne corporation at its price, the firms that offered the best quality and design were placed on a list of satisfactory suppliers. Usually no more than six companies were included for any one item.

The Payne Stores Corporation, however, did not place orders directly even with an approved company. Such a firm had to depend for contracts upon the fact that its name was included on the list of satisfactory suppliers. The purchasing official for each local division of the Payne Stores Corporation was permitted to select from the listed suppliers those from whom he wished to buy the merchandise which he required. He was free at all times to make such changes in his sources of supply as he believed desirable, but in no case was he permitted to buy from companies not on the preferred list. Invoices were sent to the main office of the Payne Stores Corporation, and a duplicate copy was forwarded to the local office concerned.

Without definite knowledge on the subject, the executives of the Laxley Company estimated in 1937 that during the previous three years the Payne Stores Corporation had purchased annually from their firm not more than a third of its average yearly requirements for inexpensive blankbooks. The Laxley Company's sales to the Payne corporation had averaged more than 5,000,000 units a year. Although these sales represented in dollar value only 10% of the Laxley Company's normal yearly receipts, they nevertheless constituted an important source of profit and volume for the company from 1934 to 1937.

During these three years the costs of producing the inexpensive loose-leaf blankbook had been kept so low that, after all outlay for direct labor and materials had been made, the Laxley Company's profits on this item represented 20% of the Payne company's unit retail price of 10 cents. By November, 1937, however, costs of raw materials and labor had risen so much that this margin had been entirely eliminated. Believing that it was inadvisable to lower wages at this time, the company seriously considered the possibility of reducing other costs.

In reviewing the operating costs incident to the manufacture of the loose-leaf books, the Laxley Company began by making a careful analysis of the ring mechanism, which was an important element in production expense, inasmuch as approximately half the total manufacturing cost for the Payne blankbook arose from the production of this unit. The ring assembly consisted of three steel parts: base plate, rings, and flat springs.

The base plate was made from steel strip cut on a semiautomatic punch press and then nickel-plated. Since this base plate was readily visible to anyone examining the finished blankbook, its appearance was an important consideration. In order to obtain an attractive surface which would require a minimum of polishing and buffing, the Laxley Company used a so-called "satin-finish" steel. This special finish added ½ cent a pound to the price of strip steel. When purchased in 6,000-pound lots this satin-finish steel cost 7 cents a pound.

The rings were cut from cold-rolled steel wire, shaped on semiautomatic machines, and then nickel-plated. Because only a part of the rings was visible, the wire did not need special finishing before the nickel was applied to its surface. These rings held the loose-leaf sheets in place in the blankbook and were gripped by flat springs so that they would remain in position when snapped shut. The springs, the third element in the ring mechanism, had to be of good quality so as to retain their tension on the rings even under frequent use. Although concealed by the base plate, the springs also were nickel-plated in order to protect them from dampness.

After analyzing the costs of manufacturing the ring assembly, the superintendent of the metals division believed that almost no economies would be effected by redesigning the mechanism. The assembly was already simpler than any other on the market and was probably at least as inexpensive to manufacture. Methods of manufacture were based on semiautomatic machinery set up on a mass production basis. It seemed probable that redesign not only would fail to reduce manufacturing costs, but also would involve expensive retooling. One new die similar to that which was being used for the punch press operation on the base plates would cost over $1,500.

To cut costs by lowering the specifications for raw materials seemed inadvisable inasmuch as the Payne corporation was buying the Laxley Company's loose-leaf blankbooks because the quality offered was the best available at the price which the chain was willing to pay. If the quality of the material was altered, the change would be apparent in the product. If the use of satin-finish steel in the base plate was abandoned on the grounds of economy, the nickel-plating could be given a smooth surface only by means of excessive buffing and polishing. If an inferior steel was used in manufacturing the rings and springs, the rings, after a time, would probably fail to remain tightly closed or to mesh properly.

Early in 1937 the superintendent of the metals division of the Laxley factory heard that the Mildner Company, located in the Pittsburgh area, was manufacturing steel sheets and strip with a true mirror finish. It was reported that the surface of this steel was so smooth that plated parts did not require buffing and polishing. The superintendent had no knowledge of the Mildner Company but was interested in the material, for he believed that the Laxley Company would realize lower costs of production if it could eliminate the buffing and polishing usually necessary in the production of the steel base plate.

The superintendent of the metals division reported to the purchasing official of the Laxley Company what he had heard about the Mildner steel and suggested that the product should be investigated. As a matter of policy the company allowed the operating officials to determine the type and quality of materials as well as the amount to be ordered. The purchasing official was responsible, however, for selecting each supplier and placing the actual order. He was also available as an advisory aid to the operating heads.

In the course of their investigation into the Mildner Company's product, the purchasing officer and the superintendent of the metals division learned that the company designed and manufactured rolling mill equipment for use by steel mills, warehouse companies, and fabricators of steel parts. After spending over $100,000 in research, the Mildner Company had been successful in developing a new type of rolls. If hot-rolled steel strip was cold-rolled with this new equipment, it took on a true mirror finish which was so bright, clear, and smooth that, were it not for the effects of rust and tarnish, nickel-plating would have been unnecessary. When the Mildner Company attempted to sell its development, it encountered inertia among the steel mills which were its logical customers. This lack of interest was thought to be due primarily to the price of the rolls, which were unavoidably expensive because their outer shell was made of a special tungsten alloy costing 45 cents a gram. For example, a pair of rolls 7 inches long by 3 inches in diameter cost $6,000.

In order to prove to steel mills that its rolls were worth what they would cost, the Mildner Company began to cold-roll steel strip, using its own rolls in the process. Executives of the company were convinced that by selling special-finish steel produced with its own rolls the company would build up a demand for this steel; they hoped that a market for its rolls then would be opened up among steel mills. Following this line of reasoning, the Mildner Company instituted an active sales campaign among the potential consumers of steel finished on its new rolls.

In the normal course of this sales promotion a salesman of the Mildner Company called on the purchasing officer of the Laxley Company and was immediately referred to the superintendent of the metals division. The salesman offered to supply the Mildner Company's mirror-finish steel at the market price of 7 cents, less the ½-cent addition which was normally charged for special-finish steel. The salesman did not suggest a written contract, nor did he indicate a definite limit on the duration of the proposed agreement. He admitted frankly that this offer was a special inducement to the Laxley Company because of its reputation for prompt payment and because of its large usage of special-finish strip.

The Laxley Company consumed over 1,000,000 pounds of steel a year, 400,000 pounds of which was special-finish steel. The superintendent estimated that a saving of ½ cent per pound and the elimination of the buffing operation would reduce costs of manufacturing the ring mechanism sufficiently to offset the entire increase in costs of materials and labor that had taken place in the first half of 1937.

After receiving the Mildner Company's offer, the purchasing officer and the superintendent of the metals division of the Laxley Company investigated the financial standing and trade position of the Mildner Company. A well-known and reliable source for this type of information stated that the Mildner Company was not listed in its service and that no financial information was available. In response to the Laxley Company's request for a special investigation, it did report, however, that the Mildner Company was a thoroughly reputable manufacturer of rolling mill equipment and was well known for its progressive and energetic management. The financial resources of the Mildner Company were said to be apparently limited, and it was believed that in seeking customers for its new steel the company was soliciting orders only from firms which were known without exception to be prompt in payments.

In order to check further upon the dependability of the Mildner Company as a satisfactory supplier of mirror-finish steel, the superintendent of the Laxley Company's metals division visited its plant. He found that the sample which the salesman had shown him was typical of the strip which was being produced. Not only was the finish consistently superior to anything else on the market, but tolerances as to thickness gauge were maintained more narrowly than by any other manufacturer. Close gauge tolerances were important if the Laxley Company's semiautomatic punch press was to operate at maximum efficiency. No manufacturing savings were expected, however, from the ability of the Mildner Company to maintain close tolerances, as the strip steel which the Laxley Company was already using in the manufacturing of the base plates was satisfactory in this respect.

In addition to finding out about the quality of the steel, the superintendent learned that the Mildner Company had a capacity for strip and sheet steel of 300 tons a day. Currently, only a negligible portion of this capacity was being utilized. The Mildner Company assured the superintendent that under no circumstances would it assume unfilled orders in excess of its daily capacity; nor would it increase its volume of business so rapidly that its cash position would be jeopardized. The Mildner Company stated that as one of the first customers for its steel the Laxley Company would always be in a somewhat favored position.

Following this visit to the plant of the Mildner Company, the superintendent and the purchasing officer decided to place a trial order for 1 ton. Upon arrival the steel strip was found to be fully as good as had been hoped. The gauge never varied more than ±0.001 inch. The finish was such that in plating, the nickel lay evenly and smoothly and required no buffing after being removed from the plating tanks. It was found that direct labor-saving would amount to ¼ cent per unit, not to mention the saving in cost of buffs and buffing equipment. Furthermore, there would be a 30% reduction in the amount of nickel necessary to impart a smooth, bright finish to the steel.

The steel manufactured by the Mildner Company conformed so closely to the exact specifications for thickness that a saving in raw material cost per foot resulted. Most steel suppliers tended to ship a large percentage of sheet and strip steel +0.001 inch, thereby increasing the weight of shipment. Since steel was purchased at prices of so much a pound, this meant an increase in the cost of the steel per foot. The saving to the Laxley Company from this source was estimated to amount to 6%.

An even more important type of saving resulted from the better temper which the Mildner Company imparted to its product. After being shaped and cut on a punch press, the steel of the Mildner Company tended to retain its shape more accurately than the steel that was formerly used. This characteristic facilitated the assembly of the finished ring mechanism and of the completed blankbook so that it was less costly from the standpoint of direct labor. The saving was expected to be equal to an amount between 1 cent and 1½ cents per 100 units.

The final decision as to whether to purchase the Mildner Company's product rested with the superintendent of the metals division, though in the course of the investigation he had depended to a great extent on the aid and assistance of the purchasing officer. He was convinced that the Mildner product was thoroughly satisfactory. He hesitated, however, to send a requisition to the purchasing officer for a supply, as he was still not completely reassured as to the dependability of the Mildner Company. He feared that it might expand its operations too rapidly in spite of its promises and thereby impose strain upon its working capital position as well as possibly affect its ability to make shipments to customers. Upon consideration, however, the superintendent decided that this danger was not likely to be of real importance during the coming year. General business conditions had been poor during the last quarter in 1937, and producers of steel were not likely to have difficulty in making shipments. Moreover, some time necessarily had to elapse before the Mildner Company could develop any extensive market for its new product. The superintendent had no idea as to the number of potential customers for the new mirror-finish steel, but he expected that in time almost any manufacturer using high-grade nickel-plated parts might be interested in it.

A shift to the new mirror-finish steel was not expected to affect unfavorably the Laxley Company's relations with its other sources of supply. Even if the Laxley Company were to order from the Mildner Company all the special-finish steel which it needed, there would remain an appreciable demand for other types of steel which could be furnished by the four companies from which it hitherto had bought all its steel. The superintendent believed that these remaining requirements of over 600,000 pounds a year were sufficient to keep the four regular suppliers interested in retaining the company's account. One of these suppliers had regularly furnished 40% of the company's total steel requirements. It was thought that within four weeks to six weeks after the receipt of an order, any one of these suppliers could furnish the company with its full requirements of the special-finish steel that it had been using up to this time. Furthermore, a one month's to two months' supply of all important raw materials was ordinarily kept on hand by the Laxley Company.

36. SHEPARD UNIVERSITY (A)

SUPPORT OF LOCAL SOURCE OF SUPPLY

The Shepard Medical School, a department of Shepard University, located in Rome, Ohio, ranked among the leading medical schools in the United States. The operation of the department required a large volume of hospital and medical supplies, not only for use in instruction and laboratory work but also for actual hospital treatment performed at the school. In 1930 the purchasing officer of Shepard University learned that the Warren Supply Company, one of the leading New York dealers in medical supplies, was about to open a branch in Rome. Previous to that time the purchasing officer had placed the major portion of his orders for the hospital and medical supplies with supply houses located outside Rome instead of with local dealers. The purchasing officer had to decide to what extent he should support the new local source of supply.

Before placing orders for routine requirements of hospital and medical supplies, the purchasing officer of the university ordinarily submitted lists of the items required and requests for bids on these items to from 10 to 12 supply houses. The entire order for any one list of items was then placed with the lowest bidder, provided that satisfactory quality and delivery service were assured. Orders placed under this method usually amounted to $100 or more. The majority of such orders were placed in New York, some in Philadelphia, and some even in Germany, with but few going to any of the five wholesale companies in Rome, which was one of the leading medical centers of the United States. In a very few instances special equipment was purchased directly from the manufacturers, but these purchases constituted a negligible portion of the total purchases of medical supplies.

The Rome dealers in medical supplies had been generally unsatisfactory as purchase sources, particularly for advance orders, partly because of high prices and occasional errors in meeting specifications for particular items, but chiefly because they did not carry a full line of supplies. In filling Shepard University's orders, these dealers often were compelled to purchase several items from New York or Philadelphia dealers. The market in Rome was geographically restricted to a small territory, and consequently the New York and Philadelphia supply houses had believed it inadvisable to establish branches in Rome with full lines of a multitude of items, for many of which the demand was decidedly limited. While inertia also may have been an important reason for not establishing branches in Rome, each company may have believed that if it opened a branch in Rome its competitors would do likewise. Since the companies in New York and Philadelphia received a majority of the orders from this territory under existing conditions, there appeared to be little advantage to be gained by opening a branch in Rome.

On the other hand, the purchasing officer of Shepard University frequently had found it necessary to call upon the Rome dealers for small orders of emergency supplies requiring immediate delivery. Demands for small orders frequently arose in the medical school as often as once a day, and many of the orders required items amounting to $1 or less. To eliminate these small orders was practically impossible because of the nature of the work in which the requirements arose. The Rome supply houses gave free delivery service of goods on these small orders. Although the purchasing officer of the university realized that the local supply houses could not make a profit on small orders alone, their occasional inability to fill orders promptly and correctly had caused him to consider them unreliable as regular sources of supply and undeserving of special consideration in the acceptance of bids which might make profitable their total sales to the university.

In 1930 the Warren Supply Company decided to open a branch in Rome, Ohio. The manager of the company realized that, since there had been no satisfactory source of supplies in Rome, the large orders were placed in New York and Philadelphia and were widely spread among several dealers. He believed that, if his company could establish a reputation for carrying the most complete line of items in the Rome territory, it would receive, first, orders for rarely used items, often of an emergency nature, which otherwise would have to be placed outside Rome, and, eventually, would probably receive a large proportion of the orders arising in Rome.

With this plan in mind the manager of the Warren Supply Company visited several potential customers in Rome, including the purchasing officer of Shepard University. The proposal submitted to the purchasing officer was that if he would cooperate with the Warren Supply Company in planning the most advisable range of items to be carried in stock, that company would establish a branch in Rome which would surpass the local dealers in service. The manager stated that the Warren Supply Company would attempt to make available at the earliest possible time a complete stock of items such as was carried in New York. This campaign by the Warren Supply Company received support sufficient to lead the company to buy the business of one of the Rome dealers and to set up a branch store before the close of 1930. Although some time was required for the Warren Supply Company to replace the stock of the former supply house, within four months the company had a full stock of its lines in the branch at Rome.

The purchasing officer of Shepard University considered the Warren Supply Company so satisfactory a source of supply that he wished to encourage the growth and stability of its new local branch in Rome. It was obvious that the university would continue to require frequently the services of local sources for rush orders, and the purchasing officer believed that he should concentrate as many orders as possible with the Warren Supply Company to insure improved service to the university in the future. Merely to concentrate the small rush orders with one company, however, would tend to decrease the profit of that company rather than to strengthen it.

After the opening of the Rome branch the prices quoted by the Warren Supply Company on large orders for the university were slightly higher than those which the company had quoted from New York, and rarely was its bid the lowest. The margin of its bids above those of companies in other cities, however, was on the average considerably smaller than that of any of the Rome dealers in the past. Seldom did this margin exceed 10%, and in a majority of cases it was less than 5%. At the same time, the quality of the Warren Supply Company's merchandise was comparable to that of competing companies in other cities. The purchasing officer of the university believed that the difference in prices quoted by the Warren Supply Company in Rome and the prices which the same company had quoted formerly from New York was justified by the expenses incurred in the operation of the branch store, where the turnover of items was certain to be less than in New York.

The lowest possible price on hospital and medical supplies was not a predominant consideration in their purchase by the university, because there was no factor of competitive costs in relation to resale prices. High quality was important in all cases, and immediate accessibility along with quality was essential for the emergency demands. Each of the departments within the university, an endowed institution, conducted its operations upon an annual budget set aside in the general funds. Prices of supplies were important, therefore, only in so far as they affected the ability of the department concerned to purchase all necessary items within that budget figure. The total purchases of hospital and medical supplies within a year approximated $125,000.

Some of the doctors in the medical school preferred certain sources of supply for their materials and equipment because they had patronized those companies before the employment of a central purchasing officer in 1925. At the same time, they insisted upon first-class service in the emergency cases.

By June, 1931, the Warren Supply Company had demonstrated its ability to maintain a branch store in Rome which met satisfactorily the needs of customers in that territory. The purchasing officer of Shepard University had adopted a policy of accepting the bids of the Warren Supply Company on large orders when its quotation was less than 5% above other bids, and on some orders when the quotations were less than 10% higher than those of competing companies.

37. ESTON COMPANY

PURCHASE FROM MANUFACTURER OR JOBBER

The Eston Company, which was located in the vicinity of Baltimore, manufactured gears, roller chains, chain drives, reductors, and other transmission equipment. The company purchased annually about 1,000 tons of steel, 500 tons of which were special alloy. Under heat treatment the special alloy steel resulted in a better distribution of properties, giving a harder outer shell and a more ductile core than was possible with any other steel known to the Eston Company. Only about 200 tons of the special alloy steel purchased by the company each year, however, were subsequently heat-treated. Early in 1938, therefore, the purchasing officer was considering the advisability of using a standard steel known as X1315 in those products that did not require heat treatment.

For 20 years the company had purchased its requirements of the special alloy steel from the Permley Company of Baltimore, a warehouse distributor specializing in the development and sale of alloy steels. As a result of its constant effort to aid its customers by finding the proper steels for their purposes, the Permley Company was well and favorably known by most steel users. Its annual sales amounted to over $1,500,000.

The special alloy steel used by the Eston Company had been developed by the Permley Company's own engineers and metallurgists. Originally this steel had been listed among the special steels which the Permley Company sold under its own private brand name, and the demand for the product had been widespread. Although there was nothing to prevent competitors from duplicating these "proprietary" steels, some measure of protection was furnished by the reputation of the company's private brand name.

In addition to merchandising its proprietary steels, the Permley Company carried a complete stock of the most common commercial steel alloys. These steels were standard throughout the industry and were available from all steel mills and warehouse distributors. The latter could furnish prompt deliveries of almost any size and type of commercial steel. The steel mills, on the other hand, generally could not make shipment in less than three weeks to six weeks and furthermore found it unprofitable to handle orders for less than 1,000 pounds. They therefore set up a schedule for quantity extras and discounts, which created a differential in their favor of from 25 cents to $1 per 100 pounds on all orders of more than 1,000 pounds. When orders were for less than this quantity, there was a differential in favor of the warehouse distributors.

For example, the mill base price for hot-rolled bars as of July, 1938, was $2.25 per 100 pounds, f.o.b. the nearest basing point, with an additional charge of 48 cents per 100 pounds delivered at Baltimore.

The mills quoted the following quantity extras and discounts:

Quantities (in pounds)	Extras (per hundredweight)	Discounts (per hundredweight)
Under 1,000	$1.50	
1,000–1,999	1.00	
2,000–3,999	0.25	
4,000–5,999	0.10	
6,000–49,999	Base	Base
50,000–99,999	.....	$0.05
100,000–199,999	.....	0.075
200,000–299,999	....	0.10
300,000 and over	.....	0.15

The similar warehouse-distributor price was $3.98 per 100 pounds, with the following extras and discounts:

Quantities (in pounds)	Extras (per hundredweight)	Discounts (per hundredweight)
Under 100	$1.50	
100–399	0.50	
400–3,999	Base	Base
4,000–9,999	.....	$0.10
10,000 and over	.....	0.15

The quantity discounts offered by the steel mills were available to all buyers of steel. No special wholesale discounts were offered to the warehouse distributors.

In its purchases of commercial steel the Eston Company placed its orders for 1,000 pounds or more directly with the steel mills.

Orders for less than 1,000 pounds of commercial steel were divided so that the steels akin to alloys were usually purchased from the Permley Company and the nonalloy steels were obtained from one of the large steel warehouses located in Baltimore.

The Eston Company's individual orders of special alloy steel from the Permley Company varied considerably as to quantity. On large shipments, 24,000 pounds or over, the Permley Company placed the order with the mill, requesting that shipment be made directly to the warehouse of the Eston Company. On these mill shipments the quantity discount given by the Permley Company amounted to approximately $1.15 per 100 pounds. It could offer this lower price because it concentrated 75% of its purchases with one mill and thus received prices that enabled it to give its customers quantity discounts and still realize a profit. Furthermore the Permley Company was a large enough customer to receive prompt attention from its steel supplier even during periods of wide demand for steel.

The Permley Company had been a very satisfactory supplier. Analysis of the steel furnished had shown it to be more nearly reliable than that of any other supplier tried by the company. Although practically speaking the Eston Company was now the only user of the special steel, the Permley Company had at all times maintained a reserve stock sufficient to fill any rush requirements of the Eston Company. If shipments from the mill were delayed, the Permley Company was available as an immediate source of supply at no extra cost to the Eston Company. In such cases the Permley Company supplied enough stock to carry the Eston Company, replacing this stock from the mill shipment. Any complaints of the Eston Company in regard to such matters as shipments, invoices, or the quality of the product were handled by the Permley Company directly with the mill. If a shipment was not quite up to specifications, the Permley Company assumed responsibility for reaching a settlement with the mill and occasionally made immediate replacement of faulty material from its own stock at no additional cost to the Eston Company in order to avoid production delays at the Eston Company's plant because of lack of raw material. In addition, the Permley Company was available as a source of expert advice on problems involving steel. Since 25% of the Eston Company's sales were special orders, this service was a valuable aid to the purchasing officer.

At its own plant the Eston Company maintained a minimum stock of steel which was about 200,000 pounds or a three months' supply. The steel was largely round bars and was carried in the following range of sizes:

Diameters, in Inches	Gradations, in Inches
½–3	1/16
3–6	⅛
6–8	¼

As of December, 1937, this stock amounted to $32,000. Although the company's production in 1937 was 27% above that of the previous year, and although steel prices had advanced nearly 20%, the company's inventory of steel as of December, 1937, was only $3,000 larger than in December, 1936. The purchasing officer believed that this was due to adequate inventory control and the continuation of prompt shipments by suppliers, particularly on orders placed through the Permley Company.

Five different steel manufacturers, two of which had warehouse subsidiaries located in Baltimore, had at various times urged the Eston Company to buy the standard steel X1315, which they claimed was comparable to the Permley product. The saving in purchase price was approximately ½ cent per 100 pounds when the steel was bought in mill quantities.

For seven years X1315 had been a standard product throughout the steel industry. In 1936 and 1937 the Eston Company had been using some of this steel and found that its properties were identical with the special alloy steel developed by the Permley Company except when used in products requiring heat treatment, in which case X1315 did not give as hard an outer case or as ductile a core as did the special alloy. Also its content of sulphur and manganese was relatively high. Normally the special alloy contained 0.04% to 0.06% sulphur and 0.09% to 1% manganese, whereas X1315 contained 0.075% to 0.15% and 1.30% to 1.60% respectively. If the content of the sulphur and the manganese was over 0.09% and 1.30% respectively, it had been the company's experience that tools used in machining these products had to be resharpened and replaced more rapidly than was normal. Occasionally the Eston Company had received shipments of X1315 containing sulphur and manganese in excess of these permissible limits.

One of the five steel manufacturers again approached the purchasing officer, this time with a different offer; namely, that it would produce and stock the same special alloy steel that was being supplied by the Permley Company provided the volume was reasonably large. The purchasing officer recognized that his company was dependent upon only one source for its most important raw material. The manufacturer, however, could offer no significant price concessions and had no warehouse carrying a complete stock within 200 miles of the Eston Company's plant. Furthermore the Eston Company had for years advertised its use of the Permley product. A product of the same quality, it was believed, however, would soon be recognized as of identical merit. There were only two other manufacturers in the United States that were equipped with acid open-hearth furnaces, which were necessary to produce this special alloy steel. Since these two were already supplying steel to the Permley Company, it was doubtful that they would be interested in furnishing the special alloy directly to the Eston Company.

The purchasing officer considered substituting X1315 for the special alloy used in the manufacture of the company products that did not require heat treatment. He did not know, however, how far he could reduce his orders from the Permley Company and still receive the same services that he had in the past, although any steel manufacturer was willing to accept orders for special alloys in heats of 75 tons.

38. PINCKARD BRASS COMPANY

PURCHASE FROM MANUFACTURER OR JOBBER

The Pinckard Brass Company, which was located in a western Massachusetts city, fabricated brass and copper into a variety of products for consumer and industrial use. Copper, the major raw material, was bought by the director of purchases; all other materials, supplies, and parts were purchased by an assistant buyer under the supervision of the director of purchases. Among the small items purchased each year were hot-rolled steel bars, which were bought from local jobbers in small quantities as required. In 1938 the assistant buyer, in reviewing his purchases of hot-rolled bars, was considering the desirability of buying them in carload quantities direct from a steel mill.

The Pinckard company used hot-rolled steel bars largely in maintenance work. The quantities required at any one time might vary from one small length of bar to a number of pieces totaling several hundred pounds in weight. In addition, the company used a wide variety of sizes ranging from ⅜ inch to 6 inches in diameter. From ⅜ inch to 1 inch, sizes varied by ⅛ inch; from 1 inch to 2 inches, by ¼ inch; and above 2 inches, by 1 inch. Although 50% of normal requirements were concentrated in the sizes ½ inch to 1½ inches, it was impossible to predict accurately the sizes and quantities which would be needed. The Pinckard company had, therefore, followed the policy of not carrying this material in its inventory and of purchasing it only in quantities sufficient to meet immediate requirements. Most of the bars the company purchased were rounds, but a few squares and hexagon shapes were also bought. The company used on the average about 30,000 pounds a year.

All this material the company currently was buying as needed from the two local metal jobbers (Companies A and B). The latter was also a mill supply house from which the Pinckard company bought most of the miscellaneous factory supplies required each year. The Pinckard company's steel purchases were divided equally between the two jobbers. As of December, 1938, the base price on hot-rolled bars bought from these jobbers was $4.01 per hundredweight with the following quantity extras and discounts:

Quantities, in pounds	Extras	Discounts
Under 100	$1.50	
100–399	0.50	
400–1,999	Base	Base
2,000–9,999		$0.20
10,000–39,999		0.30
40,000, and over		0.40

Any steel mill could supply the hot-rolled bars required by the Pinckard company. In December, 1938, the base price on mill shipments was $2.45 per hundredweight delivered at the Pinckard company's plant. To this base price the following quantity extras and discounts applied:

Quantities, in tons	Extras	Discounts
Under ½	$1.50	
½–1	1.00	
1–2	0.25	
2–3	0.10	
3–25	Base	Base
25–50		$0.05
50–100		0.075
100–150		0.10
150 net, or over		0.15

Mill shipments would normally require a period of from two weeks to six weeks before the material would be received by the Pinckard company, the period depending on whether the mill currently was running the sizes needed to fill the Pinckard company's order. The assistant buyer believed that if he purchased from a mill he could not count on delivery in less than six weeks.

The two jobbers had furnished excellent service. Both apparently stocked sufficient quantities of each of the sizes, as they had almost invariably made shipments within a few hours of receiving an order, and in many instances it was merely a question of minutes before the material was received by the Pinckard company. The cost of delivery was borne by the jobbers, who used their own trucks. An example of this service was shown by an incident which occurred in the fall of 1938. In the process of repairing an essential machine while the plant was closed down over the weekend, the maintenance department of the Pinckard company found that it needed a hot-rolled bar of a certain size. Since it was Sunday when the need arose, both jobbers' offices were closed, but when notified by telephone, one of them opened his warehouse and delivered the material to a representative of the Pinckard company. As a result, the machine was in operation the following Monday morning.

Assistance from the jobbers in solving problems connected with steel constituted another form of service to the Pinckard company. Both jobbers were available as sources of such information. For example, the Pinckard company at one time had been unable to find a satisfactory steel for reinforcing the copper ground rods which it sold for use in power plants. When a representative of one of the jobbers was asked for his opinion, he suggested SAE 1020 steel, which was tried and found to be entirely satisfactory.

Company A, which was solely a metal jobber, bought most of its brass requirements from the Pinckard Brass Company. Company B, which was mainly a mill supply jobber, but did buy some brass products, made all its purchases of such products from the Pinckard Brass Company.

39. BAIRD OIL COMPANY

BUYING FOR CONTRACTORS

The purchasing director of the Baird Oil Company believed that his department was often able to buy materials which suppliers used in making products for the Baird Oil Company at lower prices than the supplier paid. He believed that this was especially true of the materials bought by contractors who were constructing buildings for the company. In the fall of 1930 the purchasing director gave serious attention to developing a plan whereby his department, if it desired, would have the opportunity to purchase materials for contractors.

The Baird Oil Company, with main offices in Chicago, Illinois, was one of the largest units in the oil industry in the United States. The company was a completely integrated unit controlling oil wells, pipe lines, refineries, and domestic and foreign distribution systems. Approximately 100 subsidiary and affiliated companies looked to the Baird Oil Company for major management policies.

Notwithstanding the fact that most of the subsidiary and affiliated companies maintained complete business organizations, including purchasing departments, the purchasing department of the parent company was often requested to buy various materials for the subsidiary and affiliated companies. The annual purchases made by the purchasing department of the Baird Oil Company approximated $75,000,000, of which over half represented purchases made for other than the parent company.

A purchasing director, who reported to the president, was in charge of the purchasing department of the Baird Oil Company. He acted as the coordinating agent between the purchasing departments of the 100 subsidiary and affiliated companies and determined general purchasing policies. Two assistant purchasing directors supervised the actual operations of the purchasing department. Buying was carried on by seven buyers, each of whom was in charge of purchasing a particular group of commodities. These groups were as follows: (1) all tubular products, oil well equipment, and office equipment; (2) stationery, desk supplies, printing, cartons, and periodicals; (3) marine supplies, commissary supplies, lubricants, paints, containers, shipping supplies, and miscellaneous supplies; (4) packing hose, belting, drugs, chemicals, and laboratory equipment; (5) iron and steel products, building steel, wire, valves, and fittings; (6) mechanical equipment, pumps, machine tools, automobiles, and aviation equipment; (7) building and lighting supplies, lumber, refractory products, and hardware.

Exhibit 1

Weekly Commodity Indices
Prepared for the National Association of Purchasing Agents, Inc., by
McGill Commodity Service, Inc.
Auburndale, Mass.
(1926 = 100)

	Sept. 28, 1929	Jan. 3, 1930	Sept. 5, 1930	Sept. 12, 1930	Sept. 19, 1930	Sept. 26 1930
All commodities	91.8	87.5	76.8	76.9	76.9	*76.4*
Industrial	90.0	86.0	75.3	74.9	74.6	*74.3*
Agricultural	93.4	87.7	69.9	70.3	69.9	*67.1*
Livestock	96.7	92.5	87.0	88.0	88.9	**90.8**
Building materials	95.4	89.2	87.2	84.4	84.3	84.3
Chemicals	105.0	106.0	101.0	101.0	101.0	101.0
Fuels	72.6	71.6	67.7	67.9	67.9	67.9
Hides and leather	128.2	112.1	96.8	96.5	99.6	**101.6**
Nonferrous metals	101.3	96.7	69.4	68.5	67.8	*67.3*
Ferrous metals	95.9	93.9	85.4	85.4	85.4	*85.2*
Paint materials	101.9	96.3	79.3	78.7	78.1	*76.6*
Paper and pulp	94.8	93.4	91.9	91.9	91.9	*90.6*
Textiles, fine	97.5	90.8	67.1	66.6	65.5	*64.3*
Textiles, coarse	85.2	77.9	65.9	64.7	63.3	**63.8**
Vegetable oils	98.1	91.9	77.9	77.7	76.3	*73.7*

Note: Price declines are emphasized by *italics* and price increases by **bold type**.
Source: *Bulletin of the National Association of Purchasing Agents*, October 1, 1930, Vol. 1, No. 39, p. 5.

The purchasing department was responsible also for negotiating all contracts for the construction of buildings, refineries, pipe lines, and similar projects. Construction contracts were made by the purchasing director or one of the assistant purchasing directors.

In the fall of 1930 the purchasing director decided to review the various operations of his department to determine wherein economies could be effected. Business executives generally were beginning to doubt that the fall of 1930 would witness a heralded return of business activity and were becoming convinced that strict economy would have to be practiced in order to meet successfully a severe business depression. After an examination of construction contracts which had been awarded within the previous two months, it seemed to the purchasing director that prices paid had not reflected the decrease in the prices of building materials which had occurred since the fall of 1929; construction projects similar to those of 1929 reflected little or no decrease in unit costs. A summary of the decline in various commodity prices is shown in Exhibit 1. Exhibit 2 shows the index figures for the cost of building.

EXHIBIT 2
Building Cost Indices, 1929–1930
Prepared by the Federal Reserve Bank of New York
(1926 = 100)

Month	Building wages		Building materials cost		Cost of building*	
	1929	1930	1929	1930	1929	1930
January	103	107	96.6	96.2	100	101
February	103	107	97.5	95.7	100	101
March	103	107	98.8	95.4	101	101
April	103	107	97.9	94.7	100	100
May	103	108	96.8	92.9	100	100
June	103	107	96.4	90.0	100	98
July	105	108	96.7	88.9	100	97
August	105	108	96.7	87.4	101	97
September	107	108	97.5	86.4	102	96
October	107	108	97.8	85.8	102	96
November	107	108	96.0	85.6	101	96
December	107	108	96.2	84.4	101	95

* A composite of building materials (weight, 55) and building wages (weight, 45).

NOTE: Reliable construction companies estimated that in the building of factory buildings the construction dollar was apportioned as follows:

	1929	1930
Labor	30 %	40 %
Materials	60	50
Overhead and miscellaneous	10	10

SOURCE: *Standard Trade and Securities, Statistical Bulletin—1932 Base Book*, p. 256.

The purchasing director believed that contractors either were not passing on to the company the full benefit of the decline in building material prices or were not buying materials at the proper prices. In either event the company was paying more for its construction than was justified. The purchasing director decided that the only way in which he could insure that the company did not pay more than the market prices for the building materials used by contractors in construction work was to have some degree of supervision over the purchase of building materials.

Since the Baird Oil Company and its subsidiary and affiliated companies required annually several hundred thousand dollars' worth of building materials for various operating purposes, the purchasing department of the company had a buyer who specialized in the purchase of building materials. The purchasing director believed, therefore, that his department was in a better position to purchase economically the various building materials required for construction than were most contractors.

Another advantage which the purchasing director believed would accrue to the company, if some way were found to supervise contractors' purchases of material, would arise from reciprocal relationships. If purchases of building materials could be controlled, business relationships could be strengthened through the patronizing of those suppliers of building materials who used Baird oils.

The purchasing director recognized that there might be some disadvantages to his plan. The better contractors might resent his interference in what they regarded as strictly their own business. There was, furthermore, the possibility that if the purchasing department selected the suppliers, the contractor could not be held responsible in case of delay in receiving material or in instances in which faulty materials caused deviations from the building specifications. In virtually all instances the construction was supervised by members of the Baird Engineering Company, a subsidiary company which planned all construction and engineering projects for the parent company and its subsidiary and affiliated companies.

The purchasing director requested the legal department to prepare a clause which might be inserted in all construction contracts and which would allow the purchasing department to have jurisdiction over the contractors' purchases of building supplies. The legal department submitted the following clause:

> It is understood and agreed that before purchasing or making any award to suppliers for any steel, cement, sand, gravel, mason material, electrical, plumbing and heating equipment, and garage doors, the contractor shall submit to the owners' authorized representatives the bids or prices secured on said materials, and owner may then recommend to contractor another source or sources of supply of any

or all of said materials with prices, and contractor shall comply with such recommendations of the owner, provided that they do not involve additional expense to the contractor or interfere with his performance of this contract, and is responsible under the provisions hereof, and, if the prices for said materials from the sources of supply recommended by the owner are lower than the prices quoted or available to the contractor as determined by the bids or figure contractor submitted to owner, contractor shall deduct the difference or amount of such saving from the total cost of the work as stated above in this contract.

40. SISKIYOU POWER COMPANY (B)

SELECTION OF SOURCE OF SUPPLY

For a number of years prior to 1928 the Siskiyou Power Company had purchased coal breakers from the Coleman Crusher Corporation, the outstanding manufacturer of such equipment. In 1928, however, in order to secure lower prices, the company engaged the Phoenix Iron Works to construct a coal breaker to order. Two years later the Siskiyou Power Company contemplated the purchase of another coal breaker. At that time the price of Coleman crushers had been reduced to the equivalent of the quotations submitted by the Phoenix Iron Works. The purchasing officer had to decide, therefore, from which source to buy.

Coal breakers had been installed in each of the company's power houses. They were used to crush the coal prior to its firing. Once installed, they seldom required replacement except for certain parts which were subjected to constant wear. Coal breakers were massive but not of intricate construction. They weighed upward from 75,000 pounds, being composed principally of cast iron and steel.

The purchasing department of the Siskiyou Power Company, since its reorganization in 1923, had been given complete functional authority. As an aid to its efficient operation, the department collected and tabulated data which would make possible an analysis of quotations submitted by vendors, particularly in connection with equipment purchases. One rough comparison of competitive quotations which often indicated that prices were out of line was an analysis on a pound-price basis.[1] Various types of equipment were classified according to material content, manufacturing process, and other variables, and an average cost per pound then was determined for the class. In 1928 a comparison with the standard thus determined indicated that the price quoted by the Coleman Crusher Corporation was more than 7 cents per pound above the average price for that type of equipment.

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[1] See "Pound Price vs. Piece Price in Purchasing Castings," *Purchasing Agent*, February, 1926, pp. 129–131.

The buyer notified the Coleman Crusher Corporation of his finding. Since it was the policy of the Siskiyou Power Company to refrain from price haggling and since the vendor in this case refused to lower his price voluntarily, the buyer considered the advisability of having the machine constructed to order. The simplicity of the equipment rendered its manufacture a comparatively inexpensive process, which could be performed by any reliable foundry and machine shop.

The buyer first enlisted the aid of the legal department to determine the validity of the Coleman patents. When the legal department found the patents to be insecure, the buyer submitted the specifications to the Phoenix Iron Works, a local foundry and machine shop in need of work. The Phoenix Iron Works quoted a price of 14 cents per pound on a breaker weighing 85,715 pounds. The Coleman Crusher Corporation's quotation was between 21 and 22 cents per pound for the same equipment. The difference represented a saving of approximately $6,000 on the original investment, and 6% compounded thereon each year until the equipment was scrapped. The company awarded the contract to the Phoenix Iron Works. In so doing, the Siskiyou Power Company did not assume any obligation to make additional purchases from this foundry in the future. During the next few years, however, the company secured several breakers and a large quantity of parts from the Phoenix Iron Works. The prices paid closely approximated what the company determined by analysis to be fair prices.

In 1930, when the company was again in the market for a coal breaker, the Coleman Crusher Corporation, although still without active competition, had reduced its price to a fair level, apparently wishing to renew its relation with the Siskiyou Power Company.

41. TOWNSEND MANUFACTURING & SUPPLY COMPANY

LOYALTY TO A SUPPLIER

The Townsend Manufacturing & Supply Company was one of the largest manufacturers and distributors of filing supplies and equipment in the United States. In the spring of 1930 the company decided to change the quality of the paper stock used in the manufacture of a loose-leaf sheet which was employed extensively in industrial companies. The Ross Company, which had supplied the company's requirements of paper stock for the sheets in the past, did not manufacture paper stock of the new quality desired. In view of the satisfactory relationships which had existed between the Townsend Manufacturing & Supply Company and the Ross Company for the past 20 years, the executives of the former company were confronted with the problem of whether to give the Ross Company time and assistance to develop paper stock of the desired quality or to give the business to another supplier who already manufactured suitable stock.

The Townsend Manufacturing & Supply Company was one of the originators of filing devices and filing systems and had a reputation for producing the highest quality of filing supplies and equipment. It always had given special attention to making products to fill particular needs. The company manufactured its products in several plants scattered in all parts of the country. All materials, supplies, and equipment required in the manufacture of the products were purchased by the general purchasing department located in Chicago, Illinois. This department, organized for buying on a commodity group basis, was in charge of a general purchasing officer, who reported to the general manager. Purchases amounted to approximately $3,000,000 a year.

World-wide distribution of the company's products was obtained by direct selling through sales branches located in the principal cities of the United States and foreign countries. Annual sales approximated $10,000,000.

One of the company's best selling products was a sheet 8 inches by 10 inches, used extensively in industrial companies. These sheets were required to undergo continual wear and tear and were expected to remain in use many years. In 1905 when the sheets had been introduced, it had been essential that they be of a quality which would record printing and handwriting equally well. The Ross Company, a small paper manufacturer, had been asked and had expressed willingness to cooperate with the Townsend Manufacturing & Supply Company in developing a sheet which would meet all the demands imposed upon it. For 20 years the latter company had bought all its requirements for the sheet stock from the Ross Company. Requirements varied from year to year, but in 1926, one of the peak years, purchases approximated $1,000,000.

The Ross Company had devoted a large part of its production facilities to the manufacture of the sheet stock for the Townsend Manufacturing & Supply Company. In fact, in some years approximately 50% of the Ross Company's business came from the Townsend company. Thus the Ross Company had become dependent in a large degree on the business of the Townsend Manufacturing & Supply Company. The machinery used to make the sheet stock, however, could be adapted easily to the manufacture of other paper stocks.

Since the peak purchase of $1,000,000 of sheet stock in 1926, there had been a steady decline until in 1930 the purchases amounted to $500,000. The Townsend Manufacturing & Supply Company attributed this decline to the fact that typewritten notations were replacing handwritten notations in industrial companies and that therefore a sheet of different quality from that of the company's stock could be used. Sheets that possessed long-wearing qualities and were satisfactory for printing and typing were sold at lower prices than were those made from a sheet stock that was designed for handwriting.

The Townsend company had not been able to give adequate consideration to this problem, more pressing problems having claimed the attention of the executives. In the spring of 1930, however, the general manager and the general purchasing officer turned their attention to obtaining a new sheet stock of a quality which would meet the new conditions.

In the Townsend Manufacturing & Supply Company the general manager acted as the coordinating agency between sales and production. The sales department was responsible for obtaining orders, and the production department was responsible for actually manufacturing the products. The general manager determined what was to be produced, and when it was to be produced.

An investigation of sheet stock, conducted by the general purchasing officer and the paper buyer at the request of the general manager, disclosed that suitable sheet stock could be obtained from several paper companies for immediate delivery at reasonable prices. The Ross Company, on the other hand, would have to perform extensive research and experimental work in order to develop the desired sheet stock. This work might require several months' time; and, when the product was developed, it might be necessary for the Ross Company to charge a higher price than other suppliers, in order to obtain a reasonable profit.

In the past the Townsend Manufacturing & Supply Company had followed a policy of being loyal to its suppliers as long as the suppliers furnished materials of the desired quality, with adequate service, at reasonable prices. The executives of the company believed that it paid to be loyal to a supplier, because in times of material shortage the supplier usually would reciprocate the loyalty and furnish the company with the required materials before the needs of other customers were met. It was believed, furthermore, that after relationships had been maintained with a supplier for a number of years, the general purchasing department could determine with greater certainty the ability of the supplier to fill orders and to make deliveries promptly, and his willingness to make proper adjustments in case of error. Moreover, in instances when the supplier had given over a large part of his production facilities to the manufacture of materials for the company and thus had become in some degree dependent on the company, the executives believed that they had a moral responsibility to aid the supplier by continuing to give him the company's business.

During the 20 years of business relationships between the two companies, the Ross Company had supplied consistently high-quality material promptly and at reasonable prices.

During the course of the investigation, the paper buyer for the Townsend Manufacturing & Supply Company had collected a large quantity of valuable information which would be of great aid to the Ross Company in undertaking to develop a sheet stock of the desired quality. By using this information, the Ross Company probably could shorten the period of research and make the sheet stock available in a shorter time, perhaps four months. There was no way of determining in advance, however, whether the Ross Company could meet the competitive prices quoted on the sheet stock. The available evidence indicated that its price would be slightly higher than competitive prices, and that purchase of the sheet stock from the Ross Company would cost the Townsend Manufacturing & Supply Company approximately $2,000 to $3,000 more per year than would the purchase of the stock from other suppliers.

42. BOWSER & GRIFFIN COMPANY

CANCELLATION OF CONTRACT FOR PACKAGING SUPPLIES

The Bowser & Griffin Company, a large manufacturer of cosmetics, each year required several million tin cans in which to package its products. In November, 1928, the director of purchases had made a five-year contract with the Consolidated Can Company to supply a portion of his company's can requirements. The Consolidated Can Company had developed a special leak-proof, air-tight powder can for the Bowser & Griffin Company after other can companies had been unsuccessful in meeting the needs of the cosmetic company. The five-year contract had been awarded to assure the Consolidated Can Company of enough business to allow the amortization, within the contract period, of the special machinery which had to be built to make the cans. Provision was made in the contract for cancellation at the end of any year, provided that the Bowser & Griffin Company paid an amount equal to the unamortized value of the special machinery. In November, 1931, the director of purchases received an offer from the Amalgamated Can Company to supply the total requirements of leak-proof cans at a saving of 25%. The director of purchases was undecided as to what action he should take in regard to the Consolidated Can Company's contract, which did not expire for two years.

The Bowser & Griffin Company, with factory and offices in Chicago, was one of the largest makers of cosmetics in the United States. Its products were sold in drug, department, and specialty stores throughout the country and had the reputation of being of the highest quality. The packaging of the company's products was of great importance, both because an attractive package aided in drawing consumers' attention to the product and because a properly constructed container protected the product and insured its reaching the consumer in the condition in which it left the factory.

For several years prior to 1928 the company had been looking for a leak-proof and air-tight can in which to pack its powder and certain other of its products. Such a can, by protecting the products from atmospheric conditions and aiding in preserving quality, would give the company a definite sales advantage over competitors. The director of purchases, who was in full charge of all purchases, had talked with representatives of the six major can manufacturing companies concerning the development of the desired type of can, but their efforts to develop a leak-proof can had been unsuccessful.

In the fall of 1928 the Consolidated Can Company, one of the six major can manufacturing companies, informed the director of purchases of the Bowser & Griffin Company that its research department had developed a can which had the desired qualities and which could be manufactured in large numbers at a reasonable price. The Consolidated Can Company stated that it would be willing to supply the Bowser & Griffin Company with 2,000,000 of the new type of cans annually at a contract price of $75,000. If the Bowser & Griffin Company was willing to make a five-year contract, no charge would be made for the special machinery which would be required to make the cans; if yearly contracts were made, a charge of $15,000, in addition to the $75,000 contract price, would be made on the first year's contract to pay for the special equipment.

The five-year contract proposed by the Consolidated Can Company specified that the contract could be canceled at the end of any year upon the payment of a sum by the Bowser & Griffin Company equal to the unamortized value of the special machinery. A straight-line rate of $3,000 a year was to be used in figuring amortization. Provision was made also that, if changes occurred in the price of tin or in labor wages, the contract price would change so as to reflect fairly such modifications. While there was no definite understanding between the contracting parties, the cancellation clause was not intended to be used in case other companies quoted lower prices, but rather in case of changes in the style of can used, the discontinuance of the type of can called for in the contract, or a reduction in the quantity required. The Consolidated Can Company was willing to transfer to the Bowser & Griffin Company the patents which protected the manufacture of the new type of can.

The 2,000,000 cans would fill the packaging requirements of only two lines of the company's products. The company's total requirements of cans approximated 7,000,000 a year. The Consolidated Can Company was unwilling to make over 2,000,000 cans a year for the Bowser & Griffin Company because it could not spare additional manufacturing space and did not think it advisable to construct plant extensions.

The director of purchases, after satisfying sales and production executives that the recommended can had the characteristics claimed for it, decided to award a five-year contract to the Consolidated Can Company. The Bowser & Griffin Company had always followed a policy of conducting its business relationships on a high plane of ethics and had recognized moral as well as legal obligations. The director of purchases was in accord with this policy of the company. He believed that the Consolidated Can Company was entitled to the assurance of stability which a five-year contract would indicate, in return for its efforts in developing a container which materially enhanced the products of his company. The director of purchases was satisfied that the prices quoted by the Consolidated Can Company were reasonable and fair.

Shortly after the completion of the negotiations with the Consolidated Can Company, the Amalgamated Can Company, another one of the six leading can manufacturers, sent its representative to the director of purchases of the Bowser & Griffin Company with the information that it had heard of the new type of can and was in a position to manufacture a similar one. The director of purchases asked for a bid on the 5,000,000 cans which were necessary to complete his annual requirements and which the Consolidated Can Company was not willing to manufacture. The Amalgamated Can Company submitted a quotation of $175,000, plus a charge of $30,000 for the special machinery required to make the cans. No charge would be made for the machinery if a five-year contract were accepted. Such a contract would contain clauses concerning cancellation and price adjustments similar to the clauses in the contract with the Consolidated Can Company. All patents which protected the manufacture of the leak-proof cans would be turned over to the Bowser & Griffin Company. The director of purchases accepted the contract, as he believed it would insure his company a satisfactory source of supply at a reasonable price. It had been the experience of the director of purchases that the Amalgamated Can Company and the Consolidated Can Company submitted prices which were as low as, if not lower than, those of any of the other four major can manufacturers.

The use of leak-proof cans proved of value in selling the company's products, and the resulting greater demand for some of the powder products increased the can requirements about 5% after the first year. Opportunity was given to the Consolidated Can Company to bid on the additional requirements but it declined, stating that its production facilities would not permit the increased production of that type of can. The additional requirements were ordered from the Amalgamated Can Company at the same unit price that prevailed in the five-year contract.

In the fall of 1931, after the can contracts had been in successful operation for three years, and the prices had been adjusted downward approximately 15% as a result of lower material and labor costs, the Amalgamated Can Company sent a representative to the director of purchases with a new offer. If the Bowser & Griffin Company would amend the existing contract to cover its total requirements and would add three years to the length of the contract, thus giving a five-year contract dating from 1931, the Amalgamated Can Company would be willing to give a further price reduction of 25% effective immediately.

The representative of the Amalgamated Can Company said that his company was willing to make the offer because the size and regularity of the Bowser & Griffin Company's requirements allowed his company to use the business to level out its production curve, aided in carrying overhead, and in other ways effected economical production.

In order to check the new low price offered by the Amalgamated Can Company, the director of purchases asked for bids from the four other major can manufacturers. He requested also that the Consolidated Can Company send a representative to him to discuss a revision of prices. When the representative called, the director of purchases told him that the Bowser & Griffin Company had received quotations on the leak-proof cans substantially lower than existing prices and suggested that the Consolidated Can Company might be willing to refigure its prices. The representative agreed to refigure with a view to reducing the existing contract price. In the meantime quotations were received from the other four can companies, and the director of purchases found that, whereas the new price offered by the Amalgamated Can Company was lower than the quotations of the four companies, the existing price of the Consolidated Can Company was about 20% higher than the quotations received.

The representative of the Consolidated Can Company returned in about a week with an offer to reduce his company's existing price 5%; this reduction, he stated, was the greatest his company could make. The director of purchases was faced with the problem of whether to cancel the contract with the Consolidated Can Company for the remaining two years and give the total requirements to the Amalgamated Can Company, or to accept the 5% reduction and carry out the contractual agreement.

43. NORFLETT IGNITION COMPANY

ALTERNATE SOURCE OF SUPPLY

The Norflett Ignition Company manufactured ignition equipment for use in automobiles, tractors, and gasoline engines of all kinds. In 1937 annual sales exceeded $6,000,000, 25% of which represented ignition distributors of special design which the company made for a large automobile manufacturer. The casings for these distributors were cast from a special analysis gray iron and required annealing. There were only a limited number of foundries equipped to make them. Early in October, 1938, the purchasing officer of the Norflett Ignition Company was undecided as to what proportion of the company's casings requirements he should buy from each of the available sources of supply.

For six years the Norflett Ignition Company had been selling distributors to the Carlton Automobile Company, one of the largest manufacturers of passenger cars and trucks in the country. The Norflett company had been able to make a small profit on this business only by constant efforts to reduce costs of raw materials and production operations. A section of the company's plant had been converted to the production of these special distributors. Equipment, layout methods, and personnel were designed for the production of parts and their assembly into distributors on a mass production basis. Normal capacity was 5,000 units a day.

The Carlton Automobile Company had been a desirable customer. Payments were made promptly. It had regularly purchased from 40% to 60% of its requirements of distributors from the Norflett Ignition Company. Reciprocity had never become a factor in the relationship. Cooperation in regard to production economies, however, was constantly maintained, and engineers from each company frequently visited the plants of the other. The automobile company felt free to suggest to the Norflett company changes in equipment, layout methods, and personnel. Correspondingly, in 1937 when the Norflett company had developed a new application of a certain type of equipment, it invited engineers of the Carlton Automobile Company to examine the new process even though the development was not connected with the production of distributors. The automobile company recognized the value of the new process and used it successfully in its own production. Throughout 1937 the Norflett Ignition Company had received orders for about 60% of the Carlton Automobile Company's requirements of distributors. The purchasing officer of the Norflett Ignition Company believed that this consistently high percentage was at least partly in the nature of a reward.

In purchasing materials for the production of the distributors, the purchasing officer followed precisely the specifications of the automobile company. These specifications included blueprints and detailed written descriptions. When the sources for a certain required material were very limited in number, the automobile company sometimes indicated which suppliers it had from experience found satisfactory. In no instance, however, did the automobile company insist that the Norflett Ignition Company purchase from these preferred suppliers. Such suggestions were offered solely to avoid duplicating expensive investigations of potential suppliers. The automobile company, however, had not suggested suppliers for the gray iron casings.

In addition to his usual problems of finding suppliers who could manufacture the materials of the proper quality at the lowest possible cost to his company, the purchasing officer of the Norflett Ignition Company found that it was impossible to buy materials for the special distributors much ahead of actual requirements. The Carlton Automobile Company notified the Norflett Ignition Company toward the end of each month as to its probable requirements for the following month. This amount would be only an estimate, however, as the Carlton company designated from day to day the amounts to be shipped, which varied according to its actual requirements. Thus, by the end of the month, although the estimated volume might have been 60,000 units the actual shipments might have been greater or less than this amount.

The Carlton Automobile Company was well known for its practice of so scheduling the delivery dates of its purchases of materials and parts that they might enter production immediately. As a result the purchasing officer of the automobile company never bought for more than 24 hours in advance of requirements. Further, since he never gave contracts to his suppliers, relations could legally be broken off at a moment's notice. In addition, though the automobile company followed the practice of the industry of producing annual models, it retained the right to change parts specifications at any time. Suppliers were expected to be in a position to make such changes immediately if no great alterations in equipment or layout were necessary. During the preceding two years, no important changes in materials specifications had been made other than at the time of the annual model change-over.

Since the spring of 1937, the purchasing officer of the Norflett Ignition Company has been particularly under pressure to reduce the cost of materials that went into production. For 10 years the earnings of his company had been unsatisfactory. Early in 1937, when a new management was brought in, the purchasing department, along with other departments, was subjected to close scrutiny in an effort to reduce expenses and to lower costs. The purchasing officer, therefore, redoubled his efforts to insure that his company paid only the lowest possible prices commensurate with the quality and assurance of supply.

Along with other items, the purchasing officer examined his purchases of the cast iron casings used in the manufacture of the special distributors. The specifications set by the Carlton Automobile Company called for cast gray iron of a special analysis to be annealed at definite temperatures. Rigid adherence to tolerances was required.

These casings were currently being purchased from two sources. One source, the Kollmar Manufacturing Company, during the first three quarters of 1937 had supplied from over 80% to 90% of the casings required. Only 10% of the Kollmar company's foundry capacity was suited to the production of this type of small casting, and the Norflett order filled 50% of this capacity. The Kollmar Manufacturing Company operated its foundry in conjunction with its manufacture of oil burners and gasoline station equipment. Since there was excess capacity in this department, the Kollmar Manufacturing Company throughout the past four years had been producing casings for the Norflett Ignition Company. The Kollmar Manufacturing Company was a subsidiary of a large company for which at various times it had produced castings. The purchasing officer of the Norflett company believed that if the Kollmar Manufacturing Company were unable to develop profitable volume from outside for its capacity to produce small castings, the Kollmar company could fall back on the parent company for at least some volume of small castings.

From 1933 through 1937 the casings shipped by the Kollmar Manufacturing Company had been of excellent quality and deliveries had been made promptly. This supplier had carried a sufficient stock of the rough castings so that if the requirements of the Norflett Ignition Company should increase, additional casings could be annealed and finished without delay. During the peak period in 1937, this supplier had furnished over 3,000 casings a day. Though not in a position to know definitely, the purchasing officer of the Norflett Ignition Company believed that in 1937 this foundry could have supplied somewhat over 4,000 units a day without sacrificing its ability to produce small castings used in the assembly of its oil burners and gasoline equipment.

In the opinion of the purchasing officer there was, however, some question as to the desirability of the Kollmar Manufacturing Company as a permanent source of supply. If sales of oil burners and gasoline station equipment improved, the purchasing officer doubted if the Kollmar Manufacturing Company's foundry would be in a position to furnish a large percentage of his requirements. The seasonal peaks for both these products coincided roughly with the spring and fall peak requirements of the Carlton Automobile Company. Furthermore, if the automobile business should show a large increase in 1939, and if, as seemed possible, the Norflett Ignition Company should continue to supply 60% of the automobile company's distributor requirements, daily shipments might approach 5,000 units a day. This volume would require more casings than the Norflett Ignition Company had ever purchased from the Kollmar Manufacturing Company. In addition, this increase in demand for casings might coincide with improved sales of oil burners and gasoline station equipment. In such an event it would be difficult for the foundry to supply even 3,000 casings a day, the quantity required by the Norflett company during the peak period of 1937, which was a relatively good year for the sale of both oil burners and gasoline station equipment.

The second supplier, the Haldane Company, had been selling various types of castings to the Norflett company for over 15 years. During the past four years this company had supplied a small portion, not more than from 10% to 20%, of the Norflett Ignition Company's requirements of casings for the special distributors. Much of the Haldane Company's regular business came from manufacturing small castings for a large typewriter company. From 1933 to 1935, sales of typewriters were known to have increased nearly 100%. Enhanced volume had continued through early 1937 and had then slackened, partly because of overabsorption of the replacement market and partly because of the decline in general business conditions which occurred late in 1937.

In November, 1937, the Haldane Company approached the purchasing officer of the Norflett Ignition Company inquiring why it did not receive a larger share of the volume in gray iron casings for the distributors. In reply the purchasing officer stated that the Haldane Company's price was somewhat high. When the Haldane Company in answer stated that a lower price was impossible because of high labor costs, the purchasing officer suggested that the Haldane Company take steps to reduce its wage rates. He knew that, though still an open shop, the Haldane Company, following the passage of the National Industrial Recovery Act, had been unionized in 1933 and 1934 under Section 7a of that act. Average wage rates in the Haldane Company's plants were approximately 55 cents an hour, and the purchasing officer suggested early in 1938 that the president of the Haldane Company call his workers together and ask them to accept a reduction which was to be effective only when working on casings for the Norflett company. The president of the Haldane Company did not immediately accept this suggestion, but after repeated urgings by the purchasing officer of the Norflett Ignition Company, he finally agreed to try it out. Much to his surprise the workers agreed with alacrity and accepted a reduction of 5 cents an hour in their wage rates.

Upon submitting a quotation to the Norflett Ignition Company based on these lower labor costs, however, the Haldane Company was informed by the purchasing officer that its price was still ½ cent above the price which the Kollmar Manufacturing Company charged, partly because this latter company had recently reduced its price by ¼ cent. Early in September, 1938, however, following a decline in the prices of pig iron throughout July and August, the Haldane Company quoted a price that was 1 cent, or approximately 10%, under its previous quotation. After this reduction the purchasing officer of the Norflett Ignition Company gradually increased the percentage of distributor casings he was buying from the Haldane Company to about 67% of his total requirements, which at that time were approximately 3,000 a day. This volume consumed nearly 100% of the Haldane Company's normal capacity to produce small castings, or about 20% of its total capacity.

The Haldane Company, however, was not satisfied, and in October, 1938, it was urging the purchasing officer to give it still more business. The purchasing officer believed that from the standpoint of price the Haldane Company deserved the business. In addition, its service and the quality of its casings continued, even at the higher volume, to be fully equal to that offered by the Kollmar Manufacturing Company. But there was considerable doubt in his mind as to how adequate a supplier the Haldane Company would be should its regular source of business, the typewriter business, revive. The purchasing officer doubted if the Haldane Company was making much, if any, profit on the distributor casing business, and he was, therefore, of the opinion that when the Haldane Company's regular volume increased, it would not hesitate to discard the volume which was yielding such poor returns.

If all the distributor casing business was given to the Haldane Company, it would be possible for the purchasing officer to report a reduction in the purchase cost of casings of about 1 cent a unit. If production requirements continued at the rate of 3,000 distributors a day, such a saving would amount to a considerable sum in the course of a year. To be balanced against this saving was the danger that the Haldane Company would be unwilling to continue to make deliveries. The key to this latter problem was probably general business conditions throughout 1939. Assuming that the typewriter business would not have a sudden revival of extreme proportions, he was reasonably certain that the Haldane Company would prove satisfactory as long as his requirements of casings did not exceed 3,000 units a day. If volume should increase above this figure, in all probability he would be forced to fall back upon the Kollmar Manufacturing Company for from 1,000 to 1,500 units a day.

This problem of estimating the future rate of automobile operations was not new. The purchasing officer had made a practice of following the trend in automobile production by constantly consulting the reports published in the *New York Times*. Early in October, 1938, when he was considering this problem, he saw the following announcement:

> Factory sales of passenger cars and trucks in August were 91,300 units, the Automobile Manufacturers' Association estimated yesterday, indicating a total of 1,547,776 units for the first eight months of the year.
>
> In domestic retail sales an indicated total of 189,894 units in July brought the aggregate to 1,368,258 units for seven months, the association's report continued. This figure was compared with 2,816,595 cars and trucks sold during the first seven months of 1937.
>
> Dealers' stocks of unsold new cars were reduced by 66,000 units during July, it was shown, while field inventory reduction was brought to 227,600 units for seven months, a favorable record against an increase of 126,000 units in retail stocks in the same period last year.[1]

The purchasing officer knew that 1938 had been an exceedingly poor year, but from all indications it was doubtful if the total automobile production in 1939 would exceed 3,000,000 cars. This figure would be an increase of nearly 100% over 1938. If this estimate were correct, he could expect the company for which he was supplying distributors to produce somewhat less than 1,000,000 cars, as this concern normally received from 25% to 30% of the available volume. On this basis the Norflett Ignition Company would not be required to supply on the average more than 3,000 distributors a day.

The purchasing officer of the Norflett Ignition Company hoped to discontinue purchasing in any volume from either of these somewhat unsatisfactory sources after 1939. He was in the process of developing a third possible supplier. This company was an independent foundry of favorable reputation. During the previous five years its quoted prices had been too high to be competitive, but recently the company had undertaken to revamp its entire plant with a view to reducing costs, for example, by installing a modern conveyor system. From reports and personal investigation the purchasing officer of the Norflett Ignition Company believed that these changes should enable this company to quote competitive prices. In addition, he had been assured by a member of the company that it could offer a price that was equal to that currently being charged by the Haldane Company. The purchasing officer planned, therefore, when this company was in production, to shift a large portion of his requirements of distributor casings to this supplier.

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[1] *New York Times*, September 9, 1938, p. 30.

There were also three other potential sources, none of which had supplied the Norflett Ignition Company with casings. One of these concerns was noted as a manufacturer of good-quality casings used in the production of automobiles. This company was, however, in serious financial difficulties and was in the process of financial and production reorganization.

The second potential supplier had never indicated any interest in selling to the Norflett Ignition Company. This company was small and was known to have equipment that was somewhat obsolete. Also, without additional equipment this company was incapable of annealing any considerable volume of casings.

The third potential source of supply was also small but had an excellent reputation for quality and service. It was very sound financially and had a good record of profit. This foundry was not interested in producing the special distributor casings for the Norflett company, however, because of the narrow profit margin that was possible if it was to meet the price competition of the Norflett Ignition Company's current suppliers.

44. WENTHROW UNIVERSITY

PURCHASE OF COAL FOR FACULTY MEMBERS

For five years prior to 1931, the purchasing agent of Wenthrow University had made arrangements through which the members of the faculty of the university were able to buy anthracite coal for their homes at approximately 15% less than retail prices. Each year the purchasing officer had obtained an agreement for this supply of coal from one or the other of two groups of dealers operating in the city of Detroit, Michigan, where the university was located. These two groups of dealers were controlled by two of the railroad companies operating out of the coal-mining district of Pennsylvania: the Partlow Railroad Company and the Tridon Central Lines. In 1931 a third group entered the territory and sought to secure the business by underbidding both of the established sources.

During the first three years in which the purchasing officer had undertaken to render this service for the faculty, he had had little difficulty in persuading either of the two controlling companies to supply coal for this purpose practically at cost. Both companies were willing to make these sales at reduced prices; both because they would thus take away considerable business from independent dealers in the territory, and because the increased volume of their own business would absorb some of their overhead expenses on the capital invested in delivery and storage equipment. Furthermore, there were practically no sales expenses incurred by this business, and the credit of the faculty members was guaranteed by billing through the purchasing department of the university. Therefore, the two companies competed keenly for the trade upon a price basis until the price practically reached the cost of the coal laid down in their dealers' yards.

The contract made each year by the purchasing officer of the university with one of the groups of coal dealers contained no guaranty as to the quantity of coal to be purchased during the ensuing year. It was merely agreed by the group receiving the contract that its dealers would supply the coal demanded at the stated price, and by the purchasing officer that all orders for coal received by him from faculty members would be placed with some dealer of that group. Each spring a new contract was negotiated.

During the winter of 1929–1930, the volume of coal demanded by the faculty amounted to nearly 5,000 tons for the season. When in the spring of 1930 the purchasing officer attempted to renew the contract for the year 1930–1931, each of the two groups of dealers demanded a higher price on a new contract. Although the purchasing officer lacked proof, he suspected that the two groups had agreed to hold out for the higher price in order that the group which received the contract might make a profit on the expected sales of 5,000 tons during the next winter. He even suspected that the two groups, if they were successful in forcing the higher rate, might have agreed to share the profits on this business. For three months, therefore, he refused to accede to the demand of the coal groups for the increased rate. It was not until the middle of the summer that the group controlled by the Tridon Central Lines finally agreed to renew the contract at the price which had prevailed during the previous year. The purchasing officer believed that this action had been taken largely because the group feared an appreciable impairment of profits through the reduction of its volume of sales during the next winter if the contract was not accepted.

It happened that during the year 1930–1931 Wenthrow University purchased its bituminous coal for use in the university buildings from the dealers controlled by the Tridon Central Lines. This coal and the coal for the faculty members, however, were purchased on two entirely separate contracts, with an attempt to have neither contract enter into the consideration of the other.

By the spring of 1931, a third railroad company, the Askawana Railroad, was attempting to establish a strong group of retail outlets for coal in the Detroit territory. The Askawana Railroad was anxious to receive the Wenthrow University faculty contract for the season of 1931–1932, in order to build up an immediate large volume of sales which would help to absorb the overhead expenses of the capital invested in the minimum delivery and storage equipment necessary at the outset of its retail operations.

The purchasing officer of the university wished to have the Askawana Railroad enter the Detroit market. He believed that the presence of a third competitor would decrease the probability of a repetition of the attempt at price forcing made during the previous spring. He hesitated, however, to accept the contract price offered by the Askawana Railroad. This price was $10.50 a ton for egg coal, the grade in greatest demand, delivered to the customers. The price paid to the Tridon Central Lines group during the previous year had been $10.90 a ton, while the Partlow Railroad group had demanded $11.40. Although the purchasing officer knew that the members of the university faculty would be pleased to receive the price of $10.50 a ton during the coming season, he was convinced that this price was lower than the cost of placing the coal in Detroit, which he believed to be about $10.90 a ton. He feared that in the succeeding spring, when the Askawana Railroad had built up some volume of sales of coal at regular retail prices, that company would refuse to renew the Wenthrow University contract at the same price. The goodwill which might accrue to the purchasing officer from faculty members during the one year was not likely to be enough to balance the ill will which would arise from the apparently inevitable price increase in the following year. During each of the preceding five years the purchasing officer had been able to renew a contract or to enter into a new contract for coal for the faculty without an increase in the price per ton. Exhibit 1 indicates the retail price trend of anthracite coal during this period.

EXHIBIT 1
Retail Price of Anthracite Chestnut Coal, 1927–1931

Year	Cost per short ton
1927	$14.99
1928	14.87
1929	14.83
1930	14.77
1931	14.72

Source: *Survey of Current Business*, 1932 Supplement.

At the same time, since the Askawana Railroad apparently planned to undercut its competitors' retail prices in the same proportion that it underbid them in quoting to the university, ill will threatened if the purchasing officer agreed to pay the Askawana Railroad group the former year's price of $10.90 a ton. He expected the retail price quoted by the new group to be approximately $12.35 per ton. The purchasing officer feared that the faculty members would realize, in that case, that he was not making so large a saving for them as he had made in past years. The goodwill of the faculty members was of vital importance since the purchasing department wished to convince all the other departments of the university that it would be to their advantage to have all buying performed by the purchasing department.

The purchasing officer of Wenthrow University decided in May, 1931, to renew the contract with the group of coal dealers controlled by the Tridon Central Lines to deliver coal to the faculty members at $10.90 per ton for egg coal during the year 1931–1932.

45. RAWSONVILLE FURNITURE COMPANY

COMMERCIAL BRIBERY

The Rawsonville Furniture Company of Rawsonville, Vermont, was a large manufacturer of high-grade furniture. The company's annual expenditure for varnish generally exceeded $35,000 and was sometimes as high as $50,000. Shortly before Christmas, 1934, a salesman of the Barber Varnish Company, which was supplying a small part of the company's varnish requirements, presented the purchasing officer of the Rawsonville Furniture Company with a gift. Although the purchasing officer knew the salesman fairly well personally, he hesitated to accept the gift through fear that his doing so might be interpreted as an acceptance of a bribe.

For a period of several years the Rawsonville Furniture Company had divided its purchases of varnish among four companies. Two of these companies supplied high-grade varnish, which was used in comparatively small quantities by the furniture company, and two supplied varnish of a somewhat lower grade, the company's requirements of which involved an annual expenditure of almost $30,000. In 1934 approximately $25,000 of this amount went to the Whitcomb Paint Company and $5,000 to the Barber Varnish Company. The purchasing officer awarded the larger part of the business to the Whitcomb company because the quality of its product was satisfactory and the company offered a lower price than did the Barber company. He did, however, award some business to the latter company in order to maintain it as an alternate source of supply.

Although the salesman of the Barber Varnish Company did not know the exact quantity of the Rawsonville company's total varnish requirements, he was well aware that the Whitcomb Paint Company was receiving most of the orders. During the previous few years he had earnestly tried to obtain more of the furniture company's business. He claimed that his company's product was of a considerably higher quality than that of his competitor and that the price differential was slight when compared with the variation in quality. Since the purchasing officer had no means of testing varnish, this contention had not been verified. The purchasing officer had followed the practice of relying upon the men in the shop to inform him when the varnish being used was unsatisfactory. No complaints had been received from the shop, and an inquiry addressed to the shop foreman had revealed that the men were satisfied with the varnishes used and that they had not expressed any preference for either.

The salesman of the Barber Varnish Company, in the course of his attempts to obtain more of the Rawsonville Furniture Company's business, had become rather friendly with the purchasing officer of that company. He had entertained the purchasing officer when the latter had made a business trip to Boston, Massachusetts, in which the Barber Varnish Company was located. Likewise the purchasing officer had taken the salesman to lunch occasionally in Rawsonville. Their relations, while always courteous and friendly, had been, except for an occasional game of golf, confined to business.

In the early part of December, 1934, the salesman of the Barber Varnish Company sent to the purchasing officer of the Rawsonville Furniture Company a set of matched golf clubs and a leather bag, enclosing a Christmas card with the gift. Although this was not the first gift that the purchasing officer had received, previous gifts had been less pretentious, and he had accepted them rather than make an issue by returning them. The substantial value of this gift, however, would not permit such cursory treatment. The purchasing officer was considerably at a loss to know what course to pursue. Acceptance of the gift, whether because of its appeal to him personally or the possible embarrassment resulting from a refusal, might be construed as the acceptance of a bribe and thereby imply his approval of a practice that he believed to be uneconomic and vicious.

There were several basic reasons why the purchasing officer disapproved of the sales practice of offering gifts or other incentives to buyers for the purpose of influencing them in their awarding of orders. In the first place, he believed that money expended on gifts was added to the "cost of selling" and was thus ultimately charged to the purchaser in the form of higher prices. Second, such selling tactics tended to reduce the importance of quality, service, price, and similar factors in favor of an entirely personal consideration. In his opinion, however, the most harmful economic consequence of the practice was the restraint of free competition among suppliers. When carried to an extreme, as it had been in some industries, commercial bribery had the effect of causing competition in quality, service, and price to give way to competition in corruption.

Aside from its economic aspects, the practice of commercial bribery was involved in a number of legal cases, which threw some light upon its legal position. Fundamentally, the legal rulings on commercial bribery rested upon the doctrine of agency. Any breach of faith on the part of the agent, who had always been recognized by the law as occupying a fiduciary position, was not permitted. Therefore, an agent's acceptance of a bribe to do anything in conflict with the interests of his principal was not permitted by law. In *Union Central Life Insurance Company* v. *Berlin*,[1] the court stated:

> The law, on grounds of public policy, demands the utmost loyalty from agent to principal at all times, and does not permit the agent, by reason of his personal interests or otherwise, to assume an attitude in conflict with the very best interests of his principal.

In *Alger* v. *Anderson*,[2] it was held:

> The agent is not allowed, by gift, commission, or other form of compensation or consideration, to assume an attitude in conflict with the very best interests of his principal. It is a relation which, on grounds of public policy, demands the utmost loyalty to the principal at all times.

In *Robertson* v. *Chapman*,[3] Mr. Justice Harlan said:

> While his agency continues he [the agent] must act, in the matter of such agency, solely with reference to the interests of his principal. The law will not permit him, without the knowledge or assent of his principal, to occupy a position in which he will be tempted not to do the best he may for the principal.

Violation of the agency relationship through acceptance of a bribe by an employee rendered him subject to severe civil penalties. He was liable to the extent of the bribe[4] and for the compensation received from his employer;[5] he was jointly liable with the third party for any loss caused;[6] and he was subject to discharge within his contract term of service.[1] On the other hand, contracts entered into by a bribed agent could not be enforced by the supplier, as indicated in *City of Findlay* v. *Pertz:*[2]

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[1] 90 Fed. 779, Nov. 28, 1898.

[2] 78 Fed. 729, Feb. 11, 1897.

[3] 152 U. S. 673.

[4] *Boston Fishing Co.* v. *Ansell*, 39 ch. D. 339 (1889).

[5] *Andrews* v. *Ramsay*, 2 K.B. 635.

[6] *Great* v. *Gold Exploration Syndicate*, 1 Q.B. 233; *Donemar* v. *Malloy*, 252 N. Y. 260.

> Any agreement or understanding between one principal and the agent of another, by which such agent is to receive a commission or reward if he will use his influence with his principal to induce a contract, or enter into a contract for his principal, is pernicious and corrupt, and cannot be enforced at law. This principle is founded upon the plainest principle of reasoning and morality, and has been sanctioned by the courts in innumerable cases.

Also in *Alger* v. *Keith,*[3] it was ruled:

> . . . Any gratuity given to an agent of the buyer by the seller for the purpose of influencing the execution of his agency vitiates a contract which is subsequently made by the agent, as presumptively made under that influence, or subsequently made by the buyer himself, if in any material degree effected through the influence of the corrupted agent.

For a principal to be able to hold to legal account his bribe-taking agent, it was unnecessary for the principal to show either fraud or loss. In *U. S.* v. *Carter,*[4] the court said:

> . . . It is immaterial if that [*i.e.*, receipt of secret profits by agent] appears whether the complainant was able to show any specific abuse of discretion, or whether it was able to show that it had suffered any actual loss by fraud or otherwise. It is not enough for one occupying a confidential relation to another, who was shown to have secretly received a benefit from the opposite party, to say, "You cannot show any fraud, or you cannot show that you have sustained any loss by my conduct." Such an agent has the power to conceal his fraud and hide the injury done his principal. It would be a dangerous precedent to lay down as law that, unless some affirmative fraud or loss can be shown, the agent may hold on to any secret benefit he may be able to make out of his agency.

The Federal Trade Commission was created in 1914 primarily for the purpose of preventing unfair methods of competition. One of the first acts of this commission was to investigate commercial bribery in the varnish industry. During the next few years, as a result of this investigation, the commission issued cease and desist orders in about 60 cases. The facts, as set forth by the commission's investigation in the leading case, *Federal Trade Commission* v. *Reliance Varnish Works*,[1] consisted of four points:

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[1] *Wade* v. *Barr Dry Goods Co.*, 153 Mo. App. 405, 134 S.W. 1084; *Boston Fishing Co.* v. *Ansell,* 39 ch. D. 339.

[2] 66 Fed. 427, Feb. 25, 1895.

[3] 105 Fed. 105, Nov. 7, 1900.

[4] 217 U. S. 286 (1910).

1. That the company was engaged in interstate commerce in competition with companies making similar products.
2. "That for more than one year last past the respondent has given and offered to give employees of both his customers and prospective customers, as an inducement to influence their employers to purchase or to contract to purchase from the respondent, varnish and kindred products, or to influence such employers from dealing or contracting to deal with competitors of respondent without other consideration therefor, gratuities consisting of liquors, cigars, meals, theatre tickets, and other personal property."
3. That the company had given "without other consideration therefor, entertainment consisting of amusements and diversions of various kinds and descriptions."
4. That the company had given "large sums of money."

The commission held these tactics to be an unfair method of competition under Section 5[2] of the Federal Trade Commission Act and issued an order to cease and desist from such further practice.

In 1926 the commission in a memorandum ruling modified its orders[3] in these commercial bribery cases, "so as to make the same conform to the complaints, proof, and findings as originally made." The change consisted of the insertion of the word "secretly" and the phrase "without the knowledge or consent of their employers." The order was as follows:

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[1] *Federal Trade Commission Decisions*, Vol. 1, pp. 98 *ff*.

[2] "Whenever the commission shall have reason to believe that any such person, partnership, or corporation . . . is using any unfair method of competition . . . , and if it shall appear to the commission that a proceeding by it in respect thereof would be to the interest of the public, it shall . . . serve upon such person, partnership, or corporation a complaint stating its charges . . . , and containing a notice of a hearing . . . therein fixed. . . . The person, partnership, or corporation so complained of shall have the right to . . . show cause why an order should not be entered by the commission requiring such person, partnership, or corporation to cease and desist from the violation of the law so charged. . . . The testimony in such proceeding shall be reduced to writing and filed in the office of the commission. If upon such hearing the commission shall be of the opinion that the method of competition in question is prohibited by this act, it shall . . . issue . . . an order requiring such person, partnership, or corporation to cease and desist from using such method of competition.

. . . . . .

"The jurisdiction of the circuit court of appeals of the United States to enforce. set aside, or modify orders of the commission shall be exclusive."

[3] *Federal Trade Commission Decisions*, Vol. 10, p. 338.

> It is now ordered that the respondent, Grand Rapids Varnish Company, its agents, representatives, servants, and employees do cease and desist from directly or indirectly, secretly giving or offering to give, employees of its customers or prospective customers, or those of its competitors' customers, or prospective customers, without the knowledge or consent of their employers, as an inducement to cause their employers to purchase or contract to purchase from the respondent, varnish and kindred products, or to influence such employers to refrain from dealing or contracting to deal with competitors of respondent without consideration therefor, money or anything of value, and the same is hereby affirmed.

The cease and desist orders of the Federal Trade Commission were contested in several cases on the grounds that commercial bribery was not unfair competition and that the commission was, therefore, acting beyond its jurisdiction. In *T. C. Hurst & Son* v. *Federal Trade Commission*,[1] which was a bill in equity filed by T. C. Hurst & Son, ship chandlers, against the Federal Trade Commission to enjoin and restrain it from enforcing its order of June 29, 1920, the commission charged:

> T. C. Hurst & Son . . . , while engaged in their business of furnishing merchandise and supplies, such as groceries, provisions, meats, and deck and engine supplies, for transportation in interstate and foreign commerce . . . gave captains, engineers, and other employees of vessels, without the knowledge and consent of owners thereof, sums of money and other gratuities as an inducement to influence such employees or owners to purchase supplies from the respondents. . . .

The commission ruled that these were unfair methods of competition and, therefore, ordered that they be stopped. The court's ruling in Hurst's bill in equity was that the Federal Trade Commission had the right to decide that gratuities or allowances by a merchant to an employee or agent of a customer, without the knowledge or consent of the employer, are unfair, and to order persons giving the same to cease and desist therefrom. The court further said:

> For the reasons stated, the court, being further of opinion that the commission acted within its rights of and concerning a matter liable to injuriously affect commerce, doth decline to grant the injunction prayed for.

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[1] 268 Fed. 874, Oct. 2, 1920.

In subsequent cases, however, judicial decisions were adverse to the commission, imposing such severe limits upon the effect of its orders as to cause practically a termination of this work of the commission.[1] The *New Jersey Asbestos Company* v. *Federal Trade Commission*[2] case is an instance of the limiting nature of such decisions. In this case the court stated:

> We have held in *Federal Trade Commission* v. *Gratz*,[3] that only unfair practices which affect the public, as distinguished from individuals, are within the jurisdiction of the commission. We take judicial notice of the fact that the method of entertainment found to be unfair has been an incident of business from time immemorial. It is recognized by Article 133 of the Regulations covering the assessment of income tax promulgated January 2, 1918, as follows:
>
> "*Spending Money*—So-called spending or treating money, if actually advanced by corporations to their traveling salesmen to be used by them as a part of the expenses incident to selling the product of such corporations, is an allowable deduction in a return of income by such corporations. The deduction of such expenditures is conditioned upon a satisfactory showing that all the allowance claimed as a deduction was actually expended for and was an ordinary and usual expense incurred in selling the product or merchandise of the corporation."
>
> The payment of money or the giving of valuable presents to an employee to induce him to influence his employer to make a contract of purchase is a fraud justifying the discharge of the employee within his contract term of service, and perhaps the recovery by the purchaser of the amount or value of such inducement from the seller, upon the theory that it must have been included in the price. But even in such a case we think it would be a matter between individuals, and not one so affecting the public as to be within the jurisdiction of the commission, under our decision in the Gratz case, supra. However, it stretches theory to the breaking point to suppose that the entertainment expenses found unfair in this case constitute fraud practised by the respondent and by the employees on the purchasers of the respondent's goods. It is difficult to conceive that the purchaser would have a right to recover the amount of such entertainment as a part of the price paid for the goods bought, or that he would have a right to discharge the employee within the term of his service on this ground.

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[1] It has been held that sales by a ship chandler are not acts in the course of interstate or foreign commerce and, therefore, not within the jurisdiction of the commission (*Winslow* v. *Federal Trade Commission*, 277 Fed. 206, Nov. 1, 1921). However, the memorandum affirmance of the Federal Trade Commission's orders in the contested action of the Grand Rapids Varnish Company indicated a change in the judicial attitude (*Federal Trade Commission* v. *Grand Rapids Varnish Company*, 41 Fed. 996, October 8, 1929).

[2] 264 Fed. 509.

[3] 258 Fed. 314, 169 C.C.A. 330 (May 14, 1919).

> So broad a construction of the statute would bring within the disposition of the commission a vast number of subjects and controversies which in their nature belong to the legislative and judicial departments of the government. For instance, advertising is a method of selling goods which, without increasing their merits, increases their cost; and so does securing servants of competitors by paying them higher wages, though we suppose no one would say the act gives the commission a right to regulate these matters.

In the case of *Kinney-Rome Company* v. *Federal Trade Commission*,[1] although a somewhat different situation arose, the court's decision was further adverse to the commission. The agreed statement of facts was in part as follows:

> That the respondent, the Kinney-Rome Company, in the course of its business of manufacturing and selling "De Luxe" bed springs, has . . . given and offered to give premiums, such as necktie sets, etc., . . . to the salesmen of merchants handling the products of the respondent and those of its competitors, when such salesmen have been instrumental in making a sale of respondent's "De Luxe" bed springs; these premiums being given with the knowledge and consent and through arrangements with the merchants who are the employers of said salesmen . . . Salesmen of respondent's said customers do not explain the above-described system of premiums to persons to whom they sell the said "De Luxe" bed springs, so far as is known to the respondent.

After quoting several cases, the court stated:

> We conclude, from the discussion of the term "unfair competition" by the courts, and we are of the opinion, that there must be some fraud in trade that injures a competitor, or lessens competition, before it can be said that there has been used an "unfair method of competition."

The court then quoted the facts with reference to the consent of the employees and said:

> It cannot be that a merchant may personally do a thing touching his business that is illegal, but that it becomes illegal when done by another through his procurement. When petitioner did the things complained of through arrangement with the merchants, the merchants became parties to the act. As it effected sales of their property, presumably they profited by the arrangement. If it was lawful as to one, it was lawful as to the other.

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[1] 275 Fed. 665, Sept. 8, 1921.

Before 1933, statutes had been enacted in 17 states[1] aimed at the general practice of commercial bribery. The common provision in these enactments made it a misdemeanor to "give, offer, or promise any commission, gift, or gratuity whatever . . . with intent to influence the action of an agent, employee, or servant in relation to his principal, employer, or master's business; or for such agent . . . to request or accept . . . any commission. . . ." The Codes of Fair Competition, which were drawn up for the various industries in compliance with the National Industrial Recovery Act of June, 1933, afforded additional legislation concerning commercial bribery as shown in Supplement A.

SUPPLEMENT A

COMMERCIAL BRIBERY PROVISIONS IN THE NRA CODES OF FAIR COMPETITION

An examination of 100 NRA codes, which became effective before April, 1934, revealed that 69 contained provisions forbidding the practice of commercial bribery. Of these 69 codes, 21 contained the following provision:

> No member of the Industry shall give, permit to be given, or directly offer to give, anything of value for the purpose of influencing or rewarding the action of any employee, agent or representative of another in relation to the business of the employer of such employee, the principal of such agent, or the represented party, *without the knowledge of such employer, principal or party.*

In 15 of the codes the practice of commercial bribery, as defined in the following provision, was deemed to be an unfair method of competition and, therefore, prohibited:

> *Commercial Bribery:* Directly or indirectly, to give or permit to be given, or offer to give, money or anything of value to agents, employees, or representatives of customers or prospective customers, or to agents, employees, or representatives of competitors' customers or prospective customers, *without the knowledge of their employers or principals,* as an inducement to influence their employers or principals to purchase or contract to purchase from the makers of such gift or offer, or to influence such employers or principals to refrain from dealing or contracting to deal with competitors.

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[1] Connecticut, 1930; Iowa, 1931; Louisiana, 1926; Massachusetts, 1921; Michigan, 1929; Mississippi, 1930; Nebraska, 1929; Nevada, 1929; New Jersey, 1910; New York, 1909; North Carolina, 1931; Pennsylvania, 1930; Rhode Island, 1923; South Carolina, 1932; Virginia, 1930; Washington, 1922; Wisconsin, 1929.

In 16 of the codes the practice, as described in the following provision or substantially similar provisions, was denounced as an unfair trade practice and a violation of the code:

> Making or promising to any purchaser or prospective purchaser of any product, or to any officer, employee, agent, or representative of any such purchaser or prospective purchaser, any bribe, gratuity, gift, or other payment or remuneration, directlv or indirectly. . . .

Other provisions varied from regulations specially drawn to meet the unusual needs of specific industries to generalized provisions such as the following, which was contained in three codes:

> No member of the industry shall be a party to commercial bribery in any form or under any conditions.

46. CHIPMAN OIL COMPANY

RECIPROCITY

The Chipman Oil Company was a refiner and distributor of fuel oils and lubricants. Its sales volume in 1927 was $20,000,000, about 10% of which was for lubricants sold for industrial purposes. The company was confident that the quality of its lubricants and the technical service that it offered industrial users compared favorably with the products and services of competing manufacturers. Consequently the company wished to market its products on a quality and performance basis. However, the practice of reciprocity in purchasing had grown considerably since the World War and often necessitated selling on a trading basis. One of the company's chief problems in selling to the industrial market, therefore, was to induce users to select their lubricants on the basis of intrinsic merit.

The Chipman Oil Company employed 20 salesmen for the railroad market and 3 salesmen to visit steamship companies. These men were directed from the company's home office. All of them had had some actual experience in the operation of railroads or steamships. They were familiar with the oil requirements of those markets and therefore were able to recommend the lubricants best suited to the customers' needs. The salesmen visited railroad and steamship companies not only to solicit orders but also to observe the performance of Chipman lubricants.

The salesforce which the company maintained for selling to manufacturers and distributors reaching the general consumer market was managed through 14 division offices. Each division had its separate sales office and sales manager. In the 14 divisions there were approximately 375 salesmen. More than half their time was spent in selling to filling station companies and other retailers of gasoline and lubricants; the remainder was devoted to manufacturing companies, power stations, and other users, exclusive of railroads and steamship companies. The salesmen did not specialize on any particular type of market except in centers where industrial companies were sufficiently numerous to warrant a separate salesman. The salesmen had no technical knowledge of the use of lubricants other than that acquired in selling. They usually visited each manufacturing customer from eight to ten times a year, even though his annual purchases were as low as $200 or $300.

Technical service to manufacturers was rendered by the company's oil experts. The company frequently met resistance to its efforts to give service, since many purchasers thought that they knew more about their lubricating needs than anyone else did. The Chipman Oil Company, on the other hand, considered lubricating problems technical enough to require specialists; there were over a hundred kinds of oils and greases, each one best adapted to certain conditions. Upon receiving permission to make a study of a manufacturer's lubricating problems, an expert of the Chipman Oil Company would spend from two days to three weeks at the prospective customer's plant making a detailed survey. His report, after being checked at the home office, was then sent to the prospective customer. If the manufacturer decided to buy from the Chipman Oil Company, the expert went to the plant after the delivery of the oil to aid in the first applications. If the manufacturer was a large buyer, that is, one whose annual purchases of lubricants were from $8,000 to $10,000 or more, the expert returned about once a month to check on performance. A customer whose order was obtained in this manner usually continued to purchase his oil requirements from the company.

Practically all railroads, steamship companies, and large manufacturing companies, as well as many smaller companies, bought lubricants on yearly contracts. The vice president in charge of sales of the Chipman Oil Company estimated that from 60% to 65% of sales of lubricants to the industrial market were made in this manner. Chipman salesmen or experts called as frequently on contract buyers as on others, both to check the performance of the oils and to promote friendly relations with the customers.

Shortly after the World War the Chipman Oil Company's sales to a number of large users had begun to decrease. Some of the railroads, for instance, reduced their purchases in order to place more business with other oil companies which were shipping increased quantities of oil over their lines. Price was not a major consideration in these transactions because in general the prices of competing oil companies were about the same. During the succeeding years this practice of reciprocal purchasing became more and more common. Some oil companies had gone to the extreme of substituting several short hauls for one long haul to the ultimate destination in order to spread their patronage and thus be in a position to demand more patronage in return.

The vice president in charge of sales of the Chipman Oil Company pointed out that many manufacturers also were practicing reciprocity; for example, a company from which the Chipman Oil Company had been making large purchases of equipment prior to 1919 had been buying from the Chipman Oil Company about 80% of its requirements of lubricants, or about $30,000 annually. After that time this manufacturer gradually reduced its purchases from the Chipman Oil Company to about 10% of its total lubricant requirements; the Chipman Oil Company was aware that this firm's reason for withdrawing its patronage was to satisfy the demands of other refineries to which it sold equipment. In response to the action of this manufacturer the Chipman Oil Company reduced its equipment purchases from the manufacturer to an amount about equal to the dollar volume of the oil sold to the manufacturer.

Although the Chipman Oil Company was able to hold a large proportion of its lubricant business on the basis of reciprocity, the officers of the company deplored the seeming necessity for such a practice. Reciprocity practically closed to the company a great potential market which was held by competitors. The officers much preferred to sell on the merits of the company's products. They believed that many of the Chipman lubricants were superior to those of competitors who were benefiting from reciprocity. Although large industrial customers purchased oils upon specifications and thereby in one sense did not neglect consideration of quality, the president of the Chipman Oil Company pointed out that two oils showing the same chemical analysis were not necessarily of the same quality. Oil was like bread, he said, in that two samples of either might show the same chemical analysis yet might have important practical differences. In other words, reciprocity neglected certain qualitative differences and thereby, in the opinion of the officers of the Chipman Oil Company, considerably narrowed the company's market.

47. BRINE-MORE COMPANY

THREE-WAY RECIPROCITY

The Worthington Chemical Company, one of the largest producers of chemicals in the United States, included seven plants and several subsidiaries. In February, 1937, the director of the reciprocity division of the company requested the purchasing officer of a Worthington subsidiary to change one of its suppliers because it was not a customer of the Worthington company. Rather than make such a change in this instance, however, the purchasing officer of the subsidiary suggested that the supplier might influence one of its customers to increase his purchases of Worthington products.

In January, 1931, because of the general business decline, the Worthington Chemical Company had established at its home office a reciprocity division responsible for the administration of reciprocal relations for the entire company. On the basis of information furnished by the purchasing and sales departments, the division issued annual reports giving each supplier's actual and potential purchases from and sales to the Worthington organization. About 2,500 firms were listed in the 1936 report. A copy of these reports was sent to each of the company's sales managers. When a straight sales approach failed to sell the company's products, the sales representative was permitted to mention the dollar volume of purchases and to ask for business on a reciprocal basis. On the other hand, the reciprocity division could direct company purchasing officers to place orders in accordance with the best reciprocal advantages of the company.

The purchasing officer of the Brine-More Company, one of the Worthington subsidiaries, was strongly opposed to permitting reciprocity to influence his selection of sources. He felt that such influence was contrary to the principles of sound purchasing. Actually, since the Brine-More Company produced a line of consumer goods which were sold to wholesalers and retailers, the purchasing officer would not have had to consider reciprocity if his company had not been connected with the Worthington organization.

He realized that he was bound by any policies instituted by the controlling management, however, and his relations with the reciprocity director were at all times friendly. Whenever there was a conflict between good purchasing practice and reciprocal arrangements, the Brine-More purchasing officer endeavored to reach a solution acceptable to all, without injuring the purchasing activity.

In February, 1937, the reciprocity director wrote to the Brine-More purchasing officer asking whether it would be convenient for him to patronize a new supplier in his purchases of corrugated paper boxes because the Hessel Paper Box Company, Brine-More's principal supplier of such items, did not make its own paper stock and therefore was not a potential purchaser of the Worthington chemical products used in manufacturing paper. In 1936 the total sales of the Worthington organization amounted to approximately $175,000,000. Of this amount $15,000,000 represented the sales of the Brine-More Company. The total purchases of paper products by the entire Worthington organization in this same year amounted to $110,000, of which $70,000 represented purchases by the Brine-More Company. Most of the $70,000 was spent for corrugated boxes used as shipping containers.

Although the Brine-More Company bought its corrugated boxes from four companies located near its plant, 60% of these purchases were made from the Hessel Paper Box Company because its prices, quality, and service were always satisfactory. Purchases from this supplier were made on annual contract, subject to the proviso that the price paid be reviewed every three months and that the buyer be permitted to cancel his contract should the seller fail to meet any bona fide bid from another supplier. The Brine-More Company had been buying from the Hessel Paper Box Company for 12 years, and their relations had always been pleasant and satisfactory. The paper box business was highly competitive, and Brine-More's order was large enough to be thought extremely worth while by the supplier.

In 1936 the total sales of the Hessel Paper Box Company were about $1,750,000. Its total purchases of paper stock amounted to nearly $1,000,000, of which approximately $800,000 worth was obtained from the General American Paper Company, one of the largest paper manufacturers in the United States, with sales in 1936 of about $110,000,000.

The reciprocity director's suggestion that the Brine-More Company stop buying from the Hessel company and patronize some box maker that manufactured its own paper stock was unwelcome to the Brine-More purchasing officer. He believed that it was poor business to desert a reliable supplier with whom he had built up close relations over a period of years. He realized that he might be able to get as low prices from other suppliers, that perhaps he could get some other box maker to produce the same high-quality container, and that probably he could demand and get as good service elsewhere. Nevertheless, he was greatly opposed to making a change.

He therefore wrote to the reciprocity director, setting forth his point of view. He protested against the proposed change but indicated his desire to cooperate by offering to ask the sales manager of the Hessel Paper Box Company, with whom he was on friendly personal terms, to request the General American Paper Company to increase its purchases of Worthington products.

Investigation by the reciprocity division revealed that in 1936 General American purchased about $375,000 worth of chemicals of the types produced by Worthington but that Worthington had received only $30,000 of this business, which the sales manager believed was only about half its proper share. There was some evidence suggesting that General American, following its own reciprocity program, had given its chemical business largely to concerns that were not its customers, in order to use that business as an argument to sell them paper products.

The reciprocity director accepted the purchasing officer's suggestion. The latter telephoned the Hessel sales manager and explained the situation, pointing out that he did not want to change suppliers and asking that the sales manager see what he could do toward obtaining the cooperation of General American. The sales manager agreed to do so. Shortly after his conversation with an executive of the General American Paper Company, that concern increased its purchases from the Worthington company to about $75,000 a year.

48. WINDHAM COMPANY

RECIPROCITY ORGANIZATION

Beginning in 1931 the Windham Company experienced an increasing pressure from its industrial customers to purchase supplies and equipment from them on a reciprocity basis. During the following three years, reciprocity questions were handled rather haphazardly. In 1934, however, the president of the Windham Company assigned to his assistant the task of formulating a reciprocity policy and of organizing reciprocity relations on a systematic basis.

The Windham Company produced and distributed a wide line of heavy chemicals and related products and by-products. The activities of the company were organized under three main departments—production, sales, and finance—each in the charge of a vice president. Purchasing and engineering were both subdivisions of the production department.

In 1936 the company's sales amounted to about $60,000,000; one-third of this amount was sales to concerns that produced types of commodities regularly purchased by the Windham Company. These companies were in the following lines of business: trucking, railway transportation, steel, oil, rubber, copper, paper, public utilities, and electrical equipment.

In the same year the company purchased approximately $15,000,000 worth of supplies and equipment. Of this amount roughly $3,500,000 represented purchases made from companies that were actual or potential buyers of Windham products; the actual buyers received about nine-tenths of the business.

The Windham Company began to encounter reciprocity in 1931. It originated from two groups: (1) industrial customers who requested that the Windham Company buy from them because they were good customers, and (2) those large potential customers who refused to buy from the Windham Company until the latter gave them a share of the orders which they were equipped to fill.

The purchasing officer of the Windham Company was strongly opposed to allowing reciprocity considerations to affect the selection of supplies. The sales department, however, encountering increasing pressure from certain types of industrial customers, insisted that some attention should be given to reciprocity.

Gradually, therefore, and only as specific problems arose, the accounting department assembled from its records data on purchases from and sales to customer-suppliers where the amounts involved were large. Final authority relative to decisions on reciprocal purchases was placed with the vice president in charge of production.

In 1934 the president of the Windham Company decided that a definite reciprocity policy should be adopted. Accordingly he requested his assistant to take charge of organizing a reciprocity department that would be independent of both sales and purchasing. Such a department was established under the name "Trade Relations Department." The assistant to the president was in charge of the new department and in that capacity held the title of "trade relations manager." In the event of irreconcilable differences among production, sales, and trade relations, final authority rested with the president of the company.

After considerable study, the assistant to the president set up the following general policy with respect to reciprocity:

1. Whenever the Purchasing Officer opens negotiations with a possible supplier that is also a large customer and known to be aggressive in reciprocal dealings, these negotiations must be reported immediately to the Trade Relations Department, which will convey the information to all interested sales department heads.
2. The Sales Department must not state openly or by implication to any customers that it will or can cause purchases to be made from such customers.
3. Purchases of those items which are acceptable to the Engineering Division are generally to be made at the lowest price obtainable.
4. When the lowest bid is received from more than one supplier and both are satisfactory from the engineering viewpoint, the order is to be placed with the best customer either actual or potential.
5. This policy may not be changed without the approval of the President after all facts have been submitted to him in writing and agreed to by the departments involved.

The assistant to the president established the following procedure for handling additions to and replacements in existing plants, and the construction of new plants:

1. Before inviting equipment bids the Purchasing Division should submit to the Trade Relations Department a list of the required items, together with the Engineering Division's recommendation as to suppliers.

2. The Sales Department should be permitted to inspect the list of recommended suppliers and indicate which firms, from the general sales point of view, should be invited to bid. The Sales Department should then designate which of these firms should be given special consideration because of active reciprocal relations, it being understood that such consideration will be granted only when engineering and price requirements are satisfied.

3. The Purchasing Division should inspect the suggestions of the Sales Department and add the names of any suppliers which the Purchasing Officer considers essential for price protection.

4. The list is to be returned to the Engineering Division for its review. Then requests for bids should be sent out to the approved suppliers. This list of suppliers should be no longer than is necessary to obtain the best bid.

5. After the bids have been received, the Engineering Division is to indicate its decision as to whose product would be the most satisfactory one from an operating standpoint, and the Sales Department will be permitted to make a recommendation from the reciprocity point of view, giving the reasons therefor.

   a. If the Sales Department and the Engineering Division both select the lowest satisfactory bidder, no further approval is necessary.
   b. If the Sales Department and the Engineering Division agree but do not select the lowest satisfactory bidder, it is necessary to obtain the approval of the Sales Department, Production Department, and Trade Relations Department.
   c. If the recommendations of the Sales Department and the Engineering Division differ, it is necessary to obtain the approval of the Production Department and the Trade Relations Department.

6. All purchases of items required to be handled in accordance with this procedure, i.e., plant and equipment, will be given consideration by the Purchasing Division from a reciprocal standpoint without any commitment whatsoever to the vendor.

7. All requests from customers for information concerning company purchases must be referred to the Purchasing Division.

Furthermore, good customers were given an opportunity to rebid, if their original bids were too high to be approved even on a reciprocity basis. In any transaction which involved paying more money on a purchase because of reciprocal relations, the excess over the otherwise most acceptable bid was charged against the operating statement of the sales department.

On purchases of a regular and continuous nature, such as materials and supplies as distinguished from plant and equipment, no consideration was given to reciprocal problems prior to the receipt of bids from suppliers. Since such goods were purchased continuously, the sales department passed along at any time during the year its recommendations as to suppliers that should be invited to bid on the next contract. Supplies and materials were purchased on specifications drawn up by the production department. When a purchase involved contacting suppliers who from experience were known to be of sales importance, all pertinent information was entered on a form (as shown in Exhibit 3). The purchasing division furnished the information called for on parts 1, 2, and 4 of the form; the trade relations department, part 3; and the sales department, part 5. Unless the sales department wished to influence the awards, the purchasing officer placed the order on a price basis, and the form was not returned to the trade relations department until after the order had been placed. When the sales department recommended awarding the contract to a higher bidder than the one recommended by the purchasing officer, it was necessary to obtain the approval of the production and trade relations departments (on part 6 of the form) before the order was placed. The form was made out in duplicate, and after the transaction had been completed one copy was filed in the trade relations department and the other in the purchasing division.

Quarterly reports were prepared and annual records maintained in the trade relations department from data submitted by the sales department and the purchasing division. These data covered purchases from and sales to concerns selected by the trade relations department because of their importance in reciprocal dealings, or from which the Windham Company's purchases amounted to $1,000 or more a year. This list was originally prepared with the aid of information obtained from the Standard Statistics Company publications in order to include the subsidiaries of the company's customers. Companies not regularly included were added to these reports whenever such action was requested by the sales department.

The quarterly reports covered only *direct* sales and *direct* purchases. Approximately 80% of the company's sales were made direct to the final users of the products. The remaining 20% were made through jobbers, wholesalers, and dealers. Similarly, most of the company's purchases were made direct from manufacturers, only a small fraction being made through intermediaries.

Copies of the quarterly reports were sent to the officers of the company, the sales executives, and the purchasing officer. Whether information contained in these reports was divulged to the company's salesmen was left to the discretion of sales executives. In general the company's policy was not to take the initiative in reciprocity arrangements. If, however, a sales executive knew that one of its suppliers was about to place a large order for chemicals but that the Windham Company was not getting consideration, he would call on such a prospective customer and point out the friendly business relations which already existed on the buying side between the Windham Company and the prospective buyer.

The annual records were kept in a card file in the trade relations department and provided information for the same supplier-customers that were included in the quarterly reports. Each annual record card was devoted to one supplier-customer and showed purchases from and sales to that company. It also contained a brief notation of personal information, showing the names of contacted officers and directors of the supplier-customer and any connections that these men had with other organizations. On the reverse of each record card were given the names of all Windham Company representatives who had had contact with the supplier-customer and information concerning the nature of the contacts, positions held by Windham representatives, places where contacts were made, extent of relationship, and dates of last contacts. The card was as shown in Exhibits 1 and 2.

On the annual record cards, in addition to the information on direct sales and direct purchases which was recorded in black ink, were the smaller amounts of indirect sales and indirect purchases recorded in red ink. The indirect purchases were obtained from the purchasing officer, who communicated annually to the trade relations department information relating to purchases, through dealers, of goods manufactured by concerns of known aggressiveness in reciprocal activities. Information on indirect sales was obtained from divisional sales offices, in each of which was a file of "rehandler" cards which showed sales by types of products made through jobbers and dealers to industrial customers of reciprocal importance.

Year	Name of supplier-customer		A subsidiary		A subsidiary		A subsidiary		A subsidiary		Total	
	Pur. from	Sales to	Pur. from	Sales to	Pur. from	Sales to	Pur. from	Sales to	Pur. from	Sales to	Pur. from	Sales to

EXHIBIT I.—Windham Company. Annual record card of purchases from and sales to supplier-customers.

Officers	Directors	Other connections

W. Co. man	Contact	Position	Location	Relationship	Date last contacted

EXHIBIT 2.—Windham Company. Reverse of annual record card.

EXHIBIT 3
WINDHAM COMPANY
Reciprocal Relations with Five Steel Companies, 1936

General headquarters

Date July 15, 1936

To be made out in duplicate

Purchasing division ____
Trade relations department ____
Sales department ____
Production department ____

(1) Material required—Special steel plates
Quantity— 80 tons
When needed— At once
Where needed— Factory

(2) Remarks by purchasing division—Recommend low bidder, Company A

(3) Reciprocal Relations

Year	Co. Name	Purchased by W. Co.	Sales to Them
1936	A	$ 230	$ 4,250
	B	23,130	22,150
	C	8,125	55,123
	D	43,125	35,678
	E	27,300	38,240

(4) Quotations

Company	Cost Per Delivered	Total
A		$19,265
B		23,430
C		20,130
D		21,250
E		22,130

(5) It is recommended that this business be given to Company C
because of reciprocal relationship and because they have not had their share of our business.

Will this cost the company more money? yes How much? $865
What additional business will this order obtain? $50,000

A. B. Ames
Sales Department

(6) Approved by production department

Robert Dunn
Production Department

Remarks:

J. M. Wright
Trade Relations Department

In July, 1936, the Windham Company was in the market for 80 tons of special steel plates. At the same time the sales department was trying to obtain an order for $50,000 worth of heavy chemicals from one of the large steel companies. This order was required to pass through the usual procedure; pertinent data were as shown in Exhibit 3.

49. GLENGALE PETROLEUM COMPANY

ALLOCATION OF BUSINESS ON RECIPROCAL BASIS

In the spring of 1931 the management of the Glengale Petroleum Company decided upon an investigation of the company's purchasing policies, particularly with reference to its purchase of paint.

The Glengale Petroleum Company was a medium-size refiner and distributor of petroleum products, serving one of the eastern states. Annual sales approximated $70,000,000, distributed chiefly through company-owned filling stations and company salesmen who sold directly to industrial users, dealers, and agents.

The company was organized in such a manner as to obtain local administration of its activities and at the same time retain centralized control. At the home office, which was located at one end of the state, the major departments were as follows: production, in charge of refineries and manufacturing facilities; sales, in charge of service station, industrial, bulk, station, and specialties divisions; construction, in charge of obtaining locations for stations and plants, designing stations and plants, and carrying on all construction work; and finance and accounting, which was responsible for financial matters, accounting records, statistics, and the general supervision of the purchasing department. The state in which the company was located was divided into four geographical districts; three were in charge of district managers, and the fourth was administered from the home office. Although a district manager was in charge of all operations within a district, the home office organization was represented in the various departments in each district. For instance, the construction department in each district was nominally under the district manager but was supervised by the construction department organization located at the home office. The divisions of the sales department in the districts paralleled the sales department divisions at the home office. Each district had its own refinery which supplied most of the products sold in that district, although a few of the specialty products which the company sold were manufactured only at the main refinery. There were, however, no local purchasing departments and no representatives of the home purchasing department located in the districts. For all except minor purchases, which were made directly by the district offices, all orders had to be placed through the purchasing department in the home office. The various using departments in the districts sent requisitions to the central department, designating what and how much they wanted and often even the name of the supplier from whom the material was to be purchased.

The purchasing department in the home office was in charge of a director of purchases, who had two assistants, seven buyers, and nine stenographers and clerks to aid him in purchasing the $20,000,000 worth of materials and supplies which were required annually in the operation of the company. The negotiations for crude oil contracts, however, were performed under the direct supervision of the president of the company instead of in the purchasing department. Crude oil purchases were usually contracted for under a five-year contract.

Each of the seven buyers in the purchasing department was in charge of buying a group of commodities. These groups were as follows: building materials, lumber, paint, and pipe; castings, electric materials, tools, and service station supplies; steel products, machinery, and refinery equipment; chemicals, laboratory equipment, coal, furniture, and fixtures; rubber products and automobiles; gasoline outfits, tanks, and drums; and printing ink, paper, and all kinds of printing equipment and supplies. The two assistant directors of purchases assisted the buyers in making some of the larger purchases, bought special equipment for the refineries, and aided in supervising the work of the purchasing department.

The purchasing department was primarily a routine department. The using departments were expected to requisition the specific materials in the quantities they desired, and the purchasing department was then expected to buy the materials at the lowest possible prices. The purchasing department was not encouraged to question the using departments' choices of materials or suppliers. Since very few specifications had been prepared by the company for the material required in its operation, most materials were purchased by brand names or on the reputation of the supplier.

In the spring of 1931 the budget committee of the Glengale Petroleum Company, while studying the detailed tabulation of the items included in the company's budget, noticed that there

EXHIBIT 1

GLENGALE PETROLEUM COMPANY

Principal Paint Purchases, 1930

Supplier	District in which located	Kind of paint	5-gallon cans			1-gallon cans			½-gallon cans			1-quart cans			1-pint cans		
			No.	Price per gallon	Total	No.	Price per gallon	Total	No.	Price per gallon	Total	No.	Price per gallon	Total	No.	Price per gallon	Total
Hayden Paint Company	1	Color *A* pump	..	...	.....	84	$4 76	$ 399 84	11	$4 86	$ 26 73	280	$5 01	$350 70	12	$5 11	$7.66
		Color *B* pump	.	.	.....	28	3 05	85 40	11	3 15	17 35	94	3 12+	73 35	12	3 20	4 80
		Color *C* pump	..	..		28	2 40	67 20	11	2 50	13 75	10	2 65	6 63			
		Color *A* structural	4	$4 74	$ 94 80	125	4 84	605 00									
		Color *B* structural	18	2 65	238 50	121	2 75	332 75									
		Color *C* structural		.	.	120	2 90	348 00	38	3 00	57 00						
Bill Paint Company	1	Color *A* structural	10	4 40	220 00	126	4 50	567 00									
		Color *B* structural	66	2 35	775 00	242	2 45	592 90									
		Color *C* structural	11	3 40	187 00	310	3 50	1,085.00									
Theis Paint Company	1	Color *A* structural	3	3 85	57 75	53	3 90	206 70									
		Color *B* structural	40	3 20	640 00	10	3 25	32 50									
		Color *C* structural		...	.	52	2 70	140 40									
Holman Paint Company	1	Color *A* structural	10	3 10	155 00	18	3 25	58 50	42	3 45	72.45						
		Color *B* structural	39	2 65	516 75	13	2 70	35 10	82	2 90	118 90						
		Color *C* structural	7	2.30	80 50	13	2 40	31 20	36	2 60	46 80						
Willmott Paint Company	1	Color *A* structural	.	. .	. .	150	4 10	615 00	.	.	..	131	4 30	140.82			
		Color *B* structural	49	2 45	600 25	188	2 50	470 00	.	. .	.	131	2 70	88 43			
		Color *C* structural	..	..	.....	127	3 00	381 00	..	.	...	131	3 20	104 80			
Winnett Brothers	1	Color *A* pump	2	4 10	41 00	119	4 25	505 75	1	4 35	2 18	203	4 45	225 73	6	4.55	3 41
		Color *B* pump	18	2 60	234 00	89	2 75	244 75	1	2 85	1 42	158	2 95	116 53	6	3 05	2 29
		Color *C* pump	..	.. ..	.. ..	119	2 75	327 25	..	.	.....	182	2 95	134.23	6	3 05	2.29
Harris Paint Company	1	Color *A* structural	3	3 90	58.50	121	3 95	477 95									
		Color *B* structural	12	2 60	156 00	91	2 70	245 70									
		Color *C* structural	.	.	....	52	2 65	137.80									
Pabo Paint Company	1	Color *A* structural	3	3 90	58 50	50	4 00	200 00									
		Color *B* structural	24	2 95	354 00												
		Color *C* structural	..	...	.....	50	2 60	133 00									

EXHIBIT 1 (*Continued*)
GLENGALE PETROLEUM COMPANY

Supplier	District in which located	Kind of paint	5-gallon cans			1-gallon cans			½-gallon cans			1-quart cans			1-pint cans		
			No.	Price per gallon	Total	No.	Price per gallon	Total	No.	Price per gallon	Total	No.	Price per gallon	Total	No.	Price per gallon	Total
Nostern & Trent Company	1	Color *A* pump	15	$3.35	$251.25	111	$3.40	$377.40	44	$3.45	$75 90	202	$3.55	$179.28			
		Color *B* pump	37	2.35	434 75	115	2.40	276.00	44	2.45	53.95	149	2.55	94 99			
		Color *C* pump	12	2.65	159 00	110	2.70	297.00	44	2.75	60.50	155	2.85	71.69			
Ocar Paint Company	1	Color *A* structural	2	4.40	44.00	57	4.50	256.50									
		Color *B* structural	26	3 00	390.00	58	3.10	179.80									
		Color *C* structural	1	3.65	18.25	44	3.75	165.00									
Stano Paint Company	1	Color *B* structural	20	2.60	260.00	50	2.70	135 00									
B & B Paint & Color Company	1	Color *A* structural	..	.....	.....	50	3.45	172.50									
		Color *B* structural	10	2.30	115.00	50	2.35	117.50									
		Color *C* structural	..	.....	.....	50	2.35	117.50									
S & O Varnish Company	1	Color *A* structural	3	3.45	51.75	50	3.50	175.00									
L & M Supply Company	1	Color *B* structural	20	2 25	225.00	50	2.40	122.00									
Rome Varnish Company	1	Color *A* structural	15	4 60	345.00	98	4.65	455 70									
		Color *B* structural	67	2.40	804.00	93	2.45	227.85									
		Color *C* structural	8	3 60	144.00	59	3.65	215.35									

NOTE: The structural paint was used as an exterior paint primarily on metal service stations. The pump paint was used for painting the gasoline pumps. The latter paint usually had a higher luster finish than the paint used for structural purposes.

was a marked difference in the prices paid for paint in the four operating districts into which the company was divided. Inasmuch as the company spent annually between $60,000 and $70,000 for paint, the committee decided to find out whether or not it was possible to buy the company's paint requirements at a uniformly low price.

The first step taken was to determine how the company purchased paint. It was found that the using departments in each district usually specified the supplier and brand when requisitioning paint through the purchasing department. Since no agency or department within the company had ever compiled specifications for paint, the using departments were guided only by the impressions growing out of their experiences with the brand or brands of paint which they had used. From time to time the executives of the using departments in the various districts were visited by salesmen from local paint companies and were persuaded to try the products of these companies. Often the using departments in a district requisitioned paint from several suppliers in order to obtain the goodwill of the various companies. Since the purchasing department was not encouraged to change the recommendations appearing on the requisitions, it seldom questioned a requisition, even though there was a marked difference in the price of similar paints from various suppliers.

Much of the paint bought by the company was used by the attendants of filling stations for touch-up purposes. Since only a small amount of paint was used each time touch-up work was done, it was considered desirable to buy some of the paint in pint-size and quart-size cans. It was the general practice of paint companies to charge substantially higher prices per gallon for paint in small containers than in large containers because of packaging costs.

In order to determine accurately the amounts of paint which were purchased in 1930, the committee requested the purchasing department to compile a report, showing for each supplier the amount and kind of paint purchased and the prices paid. A summary of this information is shown in Exhibit 1.

Upon receipt of the detailed report showing the paint purchases for 1930, the budget committee made a comparative study of the various prices which had been paid for paint.

When questioned about his policy in placing orders, the director of purchases stated that, in instances where the requisitions for paint specified no particular source of supply, his department patronized the lowest price source within the district where the requisition originated. Usually, however, the supplier was indicated on the requisition, and there was nothing for the purchasing department to do but to obtain the supplier's best price when placing the order.

The members of the committee believed that, among other problems, attention should be given to the consolidation of quantities. It was recognized that, if all paint of one color and quality were awarded to one supplier, in all probability a lower price would be quoted than had been received in the past. The committee realized, however, that if all the paint were purchased in one district, shipping expense would be incurred to send the paint to other districts.

The problems of goodwill and reciprocity were also to be considered. Most paint companies used gasoline and lubricants; painters and varnish makers used naphtha, kerosene, and in some instances asphalt. The Glengale Petroleum Company produced and distributed these various products and was anxious to expand its market for them. If the company built up goodwill by spreading its paint purchases among the various paint manufacturers, it would be likely to receive consideration from these companies when they were in the market for petroleum products. The committee decided, therefore, that it would be wise to combine paint requirements only by districts and to request quotations from the suppliers of each district for the total requirements of paint to be used in the district. It was anticipated that no one supplier would quote the lowest price on all colors and qualities, and thus the paint purchases could be divided among the various customers of the company and yet be awarded to the lowest bidder for each color and grade of paint.

Some consideration was given to the question of buying paint in 40-gallon to 60-gallon steel drums equipped with stirring paddles and spigots. Prices per gallon would be much lower if these units of purchase were used, and the fact that the company maintained its own can manufacturing plant would make it possible to obtain adequate supplies of the desired size of cans at reasonable prices. Drums of paint could be located in store-

EXHIBIT 2

GLENGALE PETROLEUM COMPANY

Prices Quoted by Paint Suppliers in District 1 and Paint Suppliers' Purchases from Company

Supplier	Prices per gallon						Suppliers' purchases of petroleum products Jan. 1, 1930, to July 1, 1930	Suppliers' purchases of petroleum products, as percentage of total sales in District 1	Estimated percentage of the petroleum products requirements of the suppliers furnished by Glengale Petroleum Company
	Structural			Pump					
	Color *A*	Color *B*	Color *C*	Color *A*	Color *B*	Color *C*			
Hayden Paint Co.	$4.65	$2.40	$2.60	$4.70	$2.90	$2.28	$16,447.88	18.75	75
Wilmott Paint Co.	2.20	2.35	2.20	4.10	2.50	3.00	14,302.10	16.35	100
Bill Paint Co.	3.55	2.10	2.60	3.65	2.10	2.70	2,460.19	2.80	50
Howe Paint Co.	3.10	2.60	2.15	3.20	2.60	2.25	497.89	0.60	
Nizely Varnish Co.	....	....	....	....	....	....	1,904,21	2.20	15
Ocar Paint Co.	4.30	3.05	3.40	....	....	....	3,232.90	3.70	50
Theis Paint Co.	3.65	2.90	2.30	3.75	2.90	2.40	3,868.40	4.45	90
Straw Varnish Co.	....	....	....	....	....	....	7,220.72	8.25	80
Aneo Paint Co.	....	....	....	....	....	2.25	4,267.57	4.85	75
Nostern & Trent Co.	2.90	2.40	2.40	3.00	2.40	2.50	4,685.22	5.35	15
Winnett Brothers	3.60	2.50	2.35	3.75	2.65	2.75	2,624.38	3.00	85
Solar Paint & Color Co.	....	....	....	....	....	....	7,056.35	8.00	90
Dan Varnish Co.	....	....	....	....	....	....	3,215.30	3.66	50
Pabo Paint Co.	3.40	2.35	2.40	....	....	....	1,921.06	2.25	100
Smith Paint Co.	....	....	....	....	....	....	2,073.22	2.40	90
Europa Products Co.	....	....	....	....	....	....	1,767.75	2.05	40
Stano Paint Co.	3.80	2.25	2.60	....	....	....	1,521.27	1.75	
Scientific Paint Co.	....	....	....	....	....	....	1,430.23	1.65	40

houses from which filling station supplies were distributed. Inasmuch as no member of the committee had had experience in handling paint in such large quantities, no decision had yet been reached on this problem when a new factor was introduced into the situation. The Dale Oil Company, a producer and distributor of petroleum products in states adjacent to that in which the Glengale Petroleum Company operated, offered to supply the company's paint requirements at prices as low as, or lower than, those received by the company from any supplier.

The Dale Oil Company had established its own paint manufacturing facilities in order to provide for its requirements. The facilities were ample to provide also for the Glengale Petroleum Company's major requirements, which were similar in kinds of paint to those of the Dale Oil Company. Very cordial relationships had existed between the two companies in the past, and from time to time each had aided the other in investigating problems of operation and distribution and in contracting for crude oil. The management of the Glengale Petroleum Company, being desirous of continuing friendly relations with the Dale Oil Company, gave consideration to the latter's offer, which was looked upon as a request to supply the company's paint requirements.

Before making a decision on the Dale Oil Company's offer, the executives of the Glengale Petroleum Company decided that they would instruct one of the company's chemists to compile paint specifications after comparing the paint supply of the various manufacturers.

It was decided next to try out the new specifications on the paint suppliers in District 1, the location of the home office. Quantities were consolidated, and bids were requested from the suppliers in the district. Quotations were received from 11 suppliers. Before action could be taken on the award of the paint requirements to any of the suppliers in this district, the sales manager of the company requested that a report be compiled to show which suppliers in District 1 were patronizing the Glengale Petroleum Company, so that the company might obtain all possible benefits from reciprocity. The report which was compiled is summarized in Exhibit 2.

If satisfactory results were obtained from whatever plan was adopted in District 1, the company's intention was to follow the same procedure in the three other districts.

SECTION VI

PURCHASING VERSUS MANUFACTURING

50. MILLS COMPANY

PROCUREMENT BY MANUFACTURE TO ABSORB EXCESS PLANT CAPACITY

In November, 1930, the executives of the Mills Company, a leading manufacturer of sanitary equipment, had under consideration the advisability of manufacturing instead of purchasing a metal clamp. This was one of a number of minor products which were purchased from other manufacturers for resale in order to complete the line of products distributed by the company's sales organization. In the past the company had purchased its total requirements of metal clamps from the Freer Manufacturing Company.

The Mills Company manufactured all the major products it distributed. Two factories, one of which was located in St. Louis, Missouri, and the other in Boston, Massachusetts, had extensive facilities capable of producing all types of sanitary equipment and supplies of the highest quality. The company had an annual sales volume of approximately $100,000,000. National distribution of the company's products was obtained through district sales offices located in the principal cities throughout the country. Each district had a warehouse, which maintained a stock of the standard items manufactured by the company and the allied plumbing and sanitary products and supplies which were used in conjunction with the products made by the company. These allied products were purchased from other manufacturers by the general purchasing department of the Mills Company. Annual purchases amounted to approximately $60,000,000, of which $18,000,000 represented the value of fabricating parts purchased for incorporation into the products manufactured by the company and completed products bought for resale.

Prior to 1930 the company had followed a policy of manufacturing only the major items it distributed. Some exceptions to that policy had been made when it had not been possible for the company to purchase products that met the high standards of quality which it required or when suppliers quoted exorbitant prices. In many instances the company had definitely fostered other manufacturing companies in order to develop a satisfactory source of supply for fabricating parts or products purchased for resale. Long-term contracts had been made, and the manufacturers had been assured that, as long as they maintained quality, service, and reasonable prices, they would be favored with the company's business. The general purchasing department took pride in always conducting relationships with suppliers in a fair and just manner. During periods of extreme competition and price wars, the company had been known to pay higher than existing prices in order that its suppliers might cover production costs.

In the period from 1900 to 1929 the company's factories had had a steady and rapid growth as a result of the expanding demand for the equipment manufactured by the company. Estimates for future demand were continually revised by the company so that it might make production plans which would enable it to meet future needs and at the same time not to overexpand the facilities of the company. The estimates which were prepared during 1930 indicated that the future rate of growth of demand for the company's products would not be so great as it had been in the past. Under the conditions of the new estimates, production facilities of the two plants were more than ample to meet the demand for the company's products for the next few years. Recognizing this situation, the executives of the company believed that in order to make use of the surplus production facilities it might be desirable to manufacture some of the items previously purchased from other companies.

The president of the company appointed a committee, composed of the vice president in charge of manufacturing, the vice president in charge of purchasing, and the general purchasing officer, and gave it the power to investigate the advisability of manufacturing some of the items previously purchased. After several meetings the committee decided that an item, before being considered for manufacture by the company, would have to be required in large volume, be adaptable to the company's productive facilities, be produced by the company at a cost low enough to allow a saving over the price charged for the item by the supplier, and not be protected by patents to such an extent that royalties would have to be paid. The general purchasing officer was asked by the committee to study his outside purchases and suggest items which might satisfy the conditions considered necessary before manufacture was undertaken.

After surveying the products purchased from other companies, the general purchasing officer picked an item which he thought would comply with the conditions established by the committee. The item selected was a metal clamp used to fasten certain types of sanitary equipment. In the past the company had purchased its total annual requirements of approximately 5,000,000 clamps from the Freer Manufacturing Company at a unit price of 45 cents.

The Freer Manufacturing Company had produced clamps for the Mills Company for over 15 years and had always furnished satisfactory quality and service at reasonable prices. In 1927 the Freer Manufacturing Company had installed special machinery at a cost of $25,000 in order to produce the clamps more efficiently. A substantial part of the resulting economies in manufacture had been passed along to the Mills Company in the form of lower prices. The clamp business had approximated 20% of the total business of the Freer Manufacturing Company.

When manufacture of the metal clamp was suggested to the members of the committee, they authorized the vice president in charge of manufacturing to determine whether the manufacture of the clamps could be performed with the existing productive facilities and what would be the cost of manufacture. After study and investigation the vice president in charge of manufacturing decided that production of the clamp would fit in well with the job work at the St. Louis plant, although about $18,000 would have to be spent for new semiautomatic machinery. He estimated that after the installation of the new equipment the clamps could be produced at a cost of 37 cents each. No consideration had to be given to patents, as they had expired.

In presenting the findings the vice president in charge of manufacturing stressed the fact that in 1929 the company had had 10,000 employees on the pay rolls in the two plants and that in the latter part of 1930 the number of employees had decreased to 7,500. He expressed the belief that the company not only owed it to the stockholders to make full use of the production facilities of the plants but also was responsible to the employees to maintain the continuity of the work. The company had actively promoted thrift plans through employee ownership of stock and old age pension plans, and when large numbers of employees were thrown out of work through lack of employment the operation of these plans was interrupted seriously. The vice president believed, therefore, that as long as production of the clamps was suited to the facilities of the company and they could be made at a saving, the company should manufacture instead of purchase them. While the production of clamps would require only a small part of the surplus productive facilities, it would, nevertheless, be of real help and might initiate a change of company policy that would result in the manufacture of other products which previously had been purchased.

The general purchasing officer agreed that the arguments of the vice president in charge of manufacturing were sound, but he believed that there were certain arguments against manufacturing the clamps which should be considered. He pointed out that the supplier had made many efforts to furnish the company with a satisfactory product at a reasonable price and had even installed special machinery in order to do so more efficiently. Also, the supplier had become dependent in part on the business of the Mills Company. He stated, furthermore, that if the company undertook the manufacture of the clamps, other suppliers would become apprehensive of losing the company's business. Such apprehension on the part of the suppliers would result in two attitudes. The larger and stronger suppliers would probably increase their prices, for in most instances they had quoted extremely low prices because of the stable and continuing character of the Mills Company's business. The smaller and weaker suppliers would be likely to cut prices to a point unprofitable to themselves in the hope of retaining the business by eliminating any cost advantage that the company might obtain through manufacturing in its own plants.

During the committee discussion which followed the presentation of the two points of view, a further consideration was developed. Even though all the slack productive facilities were absorbed by the manufacture of items previously purchased, the effects of the business cycle would still be a serious consideration. In years of prosperity the plants would increase facilities to meet the demand for products, and in years of depression there would again be the problem of idle capacity and the necessity to decrease the number of workers. It was feared that the greater the number of products manufactured by the company, the greater would be the effect of the swings of the business cycle.

51. WILLMARTH COMPANY (A)

MANUFACTURE OF A FABRICATED PART TO INCREASE ASSURANCE OF SUPPLY

The Willmarth Company operated two plants in which it manufactured radio receiving tubes under a license agreement with the Electronic Corporation, the holder of basic patents on essential features of radio tubes. The company annually spent approximately $1,200,000 for materials and parts, about $240,000 of which was for radio tube bases.[1] The development in 1930 of a new process of base manufacturing had practically forced the Willmarth Company to depend upon the Electronic Corporation, a competitor, as its only source of supply for this important part of its product. Early in 1933, therefore, the company considered the advisability of producing its own radio tube bases.

The Willmarth Company had become a manufacturer of radio tubes early in the 1920's, when the radio industry first indicated promise of commercial importance. By 1933 the company annually produced about 12,500,000 tubes, or approximately 22% of the total production of the United States.[2] The Electronic Corporation produced about 40% of the total, while the remaining 38% was produced by eight or nine manufacturers, the largest of which accounted for slightly less than 10% and the smallest for less than 3% of the total. The license agreement between the Electronic Corporation and its licensees did not impose any restriction upon either the production of tubes or the procurement of materials; the agreement was concerned essentially with granting the licensee the privilege of using the Electronic Corporation patents in return for a royalty payment.

The bulk of the Willmarth Company's annual purchases of approximately $1,200,000 was for materials already processed, such as glass bulbs, bakelite bases, wire of varying size and material content, metal plates, solder, and operating supplies. It was the company's policy to maintain relations with several

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[1] The actual figures in this case have been disguised, but the ratios are substantially accurate.

[2] Annual production of radio tubes in the United States for the odd years 1923–1933, as given by the Census of Manufactures, was as follows:

1923	4,687,400	1929	101,988,812
1925	24,066,188	1931	49,262,888
1927	26,337,245	1933	57,042,409

sources of supply if possible. The one notable exception to this policy was the procurement of glass bulbs for tubes, which were obtainable from only one concern. The large investment in facilities and the technical skill required for efficient manufacture of glass bulbs had made impractical either the development of an alternate source of supply or the company's manufacture of its own bulbs.

As a result of the development during 1930 of a new method of producing radio tube bases, the company in the course of the next two years also found itself dependent upon one source of supply for this important part of its product. A radio tube base consisted of a bakelite shell in which were fastened from four to seven prongs or pins, which in a completed tube made the connections between the tube and other parts of the receiving set. During the early years of radio tube production, all bases were made by molding the bakelite in a form which had been previously loaded with the desired number of pins. Since a substantial amount of hand labor was necessary in early production methods, the manufacturing process was expensive. Bases at that time sold for more than $60 a thousand. The increased utilization of machinery had resulted in successive reductions in the price of bases, however, until they were sold for $30 a thousand early in 1930. During that year the Electronic Corporation developed a new method of manufacturing bases whereby the bakelite shell of the base was first molded and the pins were inserted in it afterward. The new method, called "base staking," permitted the use of automatic machinery for the entire operation. The Electronic Corporation found it possible to reduce the cost of manufacture until bases which formerly sold for $30 a thousand were sold for approximately $20. In addition to performing the manufacturing operations more cheaply, the staking method also produced a base of better quality.

The Electronic Corporation had developed its own automatic base-staking machines, which were of large capacity and had required considerable capital investment. Although the Electronic Corporation had been unable to secure patents on the staking process, such patent protection as it had secured on the staking machinery together with the heavy expense necessary to install such machinery had served to keep other base suppliers from producing staked bases. These suppliers, who were primarily manufacturers of bakelite products, had continued to produce bases by the molding process and sought to compete with the Electronic Corporation on a price basis. They found it necessary to sell at about 10% below Electronic Corporation prices because of the difference in quality between the bases and because of the prestige of the larger corporation. The reduction in prices which base molders had been forced to make had created an undesirable situation, since the molders could not make a profit. For this reason they were willing to manufacture bases only with machinery which they already had on hand. It was not profitable for them to replace worn-out equipment or buy additional equipment.

Shortly after the staking process had been developed, the Willmarth Company shifted its entire purchase of bases to the Electronic Corporation. Formerly, it had purchased part of its requirements from that company and part from two other suppliers, but the changed conditions resulting from the new process made this procedure impractical. It was apparent that the bakelite manufacturers making bases by the mold process would ultimately be forced out of business. Moreover, the bases produced by the Electronic Corporation had a pronounced advantage in that their uniformity of manufacture facilitated the fabrication of tubes in the Willmarth Company factory. In the opinion of company executives, this advantage was not offset by the 10% price differential. Furthermore, the mixing of staked and molded bases was poor policy from the production point of view.

Although the cost of the base made up only about 6% of the cost of the finished radio tube, it was an extremely important part because (1) the appearance of the base had a substantial effect on the appearance of the finished tube, (2) durability and satisfactory service of the tube were also dependent in a large measure on the base, and (3) lack of uniformity in bases was likely to result in either defective work in the company's plant or costly production interruptions.

The Electronic Corporation had base-staking facilities capable of staking 50,000,000 bases a year and was an entirely satisfactory source of supply of bases from the standpoint of quality, price, and service. The fact that the Willmarth Company was entirely dependent upon it for bases, however, together with the fact that it was a competitor, made the company's supply of bases a matter of concern to officials of the Willmarth Company. They therefore undertook to investigate the feasibility of the company's setting up its own base-staking equipment, first, to increase the company's assurance of supply of an essential part of its product, and, second, to obtain any savings which might be made..

The Allen Brass Company, which was one of the Electronic Corporation's suppliers of base pins, had developed a base-staking machine which was capable of staking 18,000 bases a day. This company was willing to manufacture and sell these machines to the Willmarth Company at cost for the privilege of supplying its pin requirements. Although only one machine had been built, and that for experimental purposes, the Willmarth Company executives were convinced that it would stake bases of satisfactory quality at a reasonable cost. Although acceptance of the Allen Brass Company's offer to supply staking machinery at cost obliged the company to buy the bulk of its pin requirements from that company, no contractual agreement was required. For its own protection the Willmarth Company would be free to buy a part of its pins from another concern.

By staking its own bases, the Willmarth Company would have complete control over quality. This control would involve the developing of dependable sources of supply for both the brass pins and the bakelite shells which were fabricated into the completed base. The quality of pins was easy to maintain, and almost any manufacturer of brass products could produce them. This item therefore raised no problem of importance. Quality control of shells was a matter of greater concern, however, since the care exercised in cleaning molds, the control of material content of the bakelite, and the precision with which the molding operations were carried on, all had a material effect on whether bases were satisfactory.

Investigation of the cost of the Willmarth Company's staking its own bases indicated that necessary equipment would require an investment of $23,000. Three staking machines would be needed for one of the company's plants, and two would be required for the other. The five machines would cost a total of $12,500 installed. In addition to staking machines, the company would also have to buy molds for the use of its shell suppliers. Seven molds would be required, three for small bases and four for large, at a cost of $1,500 apiece, or a total of $10,500. On the basis of this investment in facilities and the prices quoted for shells and pins, the cost department drew up production cost estimates for a volume of 12,500,000 bases a year. These estimates, together with the prices which the company was currently paying for each type of base, were as shown in Exhibit 1.

EXHIBIT 1
WILLMARTH COMPANY
Estimated Cost of Staked Bases
(Price per 1,000)

	Small			
	4 Prong	5 Prong	6 Prong	7 Prong
Shell	$ 5.40	$ 5.40	$ 5.40	$ 5.40
Pins	3.65	4.56	5.47	6.38
Labor and manufacturing expense*	3.58	3.58	3.58	3.58
Estimated total cost	$12.63	$13.54	$14.45	$15.36
Electronic Corporation price	15.00	16.20	17.40	21.60
	Large			
Shell	$ 7.20	$ 7.20	$ 7.20	$ 7.20
Pins	3.65	4.56	5.47	6.38
Labor and manufacturing expense*	3.58	3.58	3.58	3.58
Estimated total cost	$14.43	$15.34	$16.25	$17.16
Electronic Corporation price	17.70	18.90	20.10	23.40

* The mold amortization rate was computed to write off the entire investment in one year the rate of depreciation on machines, to write off investment in two years. Overhead was entered at 200% of direct labor; this amount covered supervision, maintenance, variable burden, and fixed burden. Inspection was figured as a check of bases selected from production at random.

It was apparent that maintaining quality control of the staking operation and of shells would entail considerably more responsibility on the part of the company than the purchase of finished bases from the Electronic Corporation. The Willmarth Company officials therefore hesitated to undertake the manufacture of the company's base requirements. In their opinion, the Electronic Corporation did not make an unreasonable profit on bases. There was some doubt, therefore, aside from the consideration of assurance of supply, as to whether the assurance of quality received from this supplier was not worth the possible savings the company might realize.

52. BELL CHEMICAL COMPANY

PROPOSED DISCONTINUANCE OF PROCUREMENT BY MANUFACTURE

The purchasing director of the Bell Chemical Company believed that his department was at no time justified in paying company-owned manufacturing subsidiaries more for a product than would have to be paid for the same product in the open market, quality and service considered. In 1930 the Bell Shipping Box Company, a wholly owned subsidiary of the Bell Chemical Company, was charging more for shooks[1] than independent shook manufacturers were charging. The purchasing director took the stand that unless the Bell Shipping Box Company could meet competitive prices it should not be favored with the business, and that, if necessary, its plant should be closed. The executives of the Bell Shipping Box Company maintained that they were quoting the lowest possible prices, considering production costs. They stated, furthermore, that the Bell Chemical Company was obligated to buy from the subsidiary even at higher prices than were quoted elsewhere, as otherwise the subsidiary would have to close its plant and there would be a substantial loss of invested capital.

The Bell Chemical Company, with offices in Philadelphia, was one of the largest chemical manufacturing companies in the United States. It was a completely integrated company, controlling approximately 50 subsidiary companies which were engaged in extracting raw materials, manufacturing both heavy and light chemicals, manufacturing products requiring large quantities of chemicals, and distributing the various products in the domestic market and in foreign countries.

The company had always followed a policy of manufacturing only those items which were directly concerned with the making of its products. All other requirements were purchased from other companies. From time to time, however, special conditions had made it necessary or desirable for the company to form a subsidiary corporation to undertake the manufacture of a product which normally did not belong in the family of the company's enterprises.

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[1] Shooks were sets of boards for making shipping crates and boxes. The shooks used by the Bell Chemical Company were made from North Carolina pine and were 3/8 inch thick and 20 5/8 inches by 10 3/8 inches at the top and bottom, the sides and ends being small.

In 1905 special conditions had made it desirable to form the Bell Shipping Box Company to manufacture shooks for the shipping cases used by the company in shipping its products to various parts of the United States and to foreign countries. At that time the major shook manufacturers in the United States were united in a price-fixing agreement and were able to maintain higher prices than were justified by production costs or the conditions of supply and demand. The Bell Chemical Company planned to have the new subsidiary, the Bell Shipping Box Company, supply approximately 55% of the shook requirements of the company and its subsidiaries. The shook requirements in 1905 were heavy, approximating 15,000,000 shooks with a value of about $4,000,000.

The executives hoped that the company, by being in a position to secure over half its shook requirements from a company-owned plant, would receive fair prices from the shook manufacturers for the remainder of its requirements. The plan proved to be successful, the company being able to manufacture economically over half its requirements and to purchase the remainder at fair prices from other manufacturers. Under this arrangement the Bell Chemical Company took the entire production of its shook plant.

This method of securing the company's shook requirements partly by manufacture and partly by purchase from other manufacturers continued until the United States entered the World War. At that time there was such an enormous demand for shipping boxes and crates to send foodstuffs, war materials, and necessities of all kinds to Europe that the Bell Chemical Company found itself very fortunate in having its own source of supply for shooks. By operating the shook plant day and night the company was able to produce about 80% of its requirements without a great expansion of its facilities. The remaining 20% was purchased in the open market. Many of the shook manufacturers increased production capacity in attempting to fill all the orders which were pouring into their plants.

Following the World War, with the return to normal demands for materials and supplies, the shook manufacturers found that

EXHIBIT I

Manufacturers of Wooden Boxes, Crates, and Shooks*

Year	Number of establishments	Wage earners (average per year)	Wages	Cost of materials, fuel, and purchased electric energy	Value of products	Value added by manufacture†
1929	792	30,554	$29,193,575	$ 74,081,937	$135,025,675	$60,943,738
1927	748	30,797	29,250,351	75,797,392	133,992,877	58,195,485
1925	824	34,834	33,764,709	86,391,171	152,294,579	65,903;408
1923	864	39,154	36,464,026	94,080,353	162,857,784	68,777,431
1921	878	32,595	28,307,330	73,269,702	122,587,582	49,317,880
1919	1,140	42,445	36,811,185	102,946,235	177,818,454	74,872,219
1909	1,179	35,449	15,335,992	46,478,462	75,342,488	28,864,026
Decrease 1919–1929	−30.5%	−28.0%	−20.7%	−28.0%	−24.1%	−18.6%

* Exclusive of cigar boxes. The figures contained herein do not include wooden boxes, crates, and shooks manufactured outside the industry as secondary products of other industries. In 1927, the only year in which figures were available, this outside production had a value of $55,946,870.

† Value of products less cost of materials, supplies, fuel, and power.

Source: U. S. Bureau of the Census, *Census of Manufactures: 1929.*

their plants had been expanded beyond normal demands. This overcapacity led to drastic price cutting during the 1920–1921 depression, and as a result the Bell Chemical Company was in a position to buy shooks in the open market more cheaply than they could be produced by the Bell Shipping Box Company. The parent company, however, continued to take the entire output of its subsidiary, paying the higher prices without question.

The shook industry recovered to some extent after the depression but did not approach the predepression levels of production. In fact after 1923 there was a steady downward trend in the industry, as shown in Exhibit 1.

The primary reason for the shook industry's experiencing a downward trend was the fact that paper boxes and corrugated containers were supplanting wooden containers. Improved methods of manufacture and new designs of paper containers had reduced the prices of such containers, making them equal to or lower than the prices of wooden containers. Moreover, as the weight of paper containers was less than that of wooden boxes, shipping costs were reduced. The decrease in demand for shooks was reflected in lower prices, as the shook manufacturers tried to obtain business enough to keep their plants operating. The Bell Chemical Company had adopted corrugated containers for shipping many of its products, and thus its shook requirements had decreased steadily. The company, however, had continued to buy shooks from its subsidiary even though it had to pay higher prices than could be obtained elsewhere. Orders were placed with shook manufacturers only when the shook plant working under normal conditions could not produce the entire requirements.

Late in 1928 the purchasing director, a man with a very forceful personality, announced a policy of buying supplies from subsidiaries only when the subsidiaries were able to meet competitive prices. He stated that unless the subsidiaries could supply the company at prices the same as, or lower than, those charged by other suppliers, he could see no economic justification for the continuance of the subsidiary company.

Early in 1929 the Bell Chemical Company made major changes in its method of distributing its products in an attempt to meet more efficiently the new tariffs which were being levied in foreign countries. It established can factories in various foreign countries, shipped its products abroad in bulk, and packaged them in the country where the products were to be used. This action further decreased the company's requirements for shooks to less than 8,000,000 per year, a number which the Bell Shipping Box Company was in a position to supply.

In 1929 the purchasing department of the Bell Chemical Company had contracts with outside suppliers for the purchase of approximately 3,000,000 shooks at prices lower than the Bell Shipping Box Company was able to quote. A typical example of the difference in price was as follows: 3/8 size shooks could be purchased from outside suppliers at a unit price of 34 cents, while the subsidiary company charged 36 cents per unit.

The management of the Bell Shipping Box Company objected violently to the fact that the purchasing department was awarding some of the shook business to outside suppliers when the subsidiary company was in a position to produce the company's requirements and needed the business to maintain efficient operation. The purchasing director stated that he could see no justification for awarding any of the business to the subsidiary so long as it charged higher prices than were charged by other manufacturers.

The arguments were taken to the president of the company, who appointed a committee to investigate the situation and recommend a course of action. The committee consisted of the vice president in charge of operations of the Bell Chemical Company and its subsidiaries as chairman, the purchasing director of the Bell Chemical Company, and the general manager, who was the chief executive, of the Bell Shipping Box Company. The committee started its investigation by making a survey of the company's shook requirements. It discovered that since 1925 there had been a decrease of 44% in the company's demand for shooks, and it estimated that within the next five years there would be a decline from the 1929 level of approximately 50%. The downward trend of the demand was attributed to the policy of the company of establishing can factories in foreign countries and making bulk shipments to those countries.

The committee then made a survey of the shook manufacturers. This examination showed that while there had been a steady decrease in the number of manufacturers there were still enough to furnish adequate supplies of shooks to all users. Some of the shook manufacturers were attempting to dispose of their plants, but there was little chance that they would be successful, since a shook plant could not be adapted readily to the manufacture of other items. The committee came to the conclusion that it was not likely that there would be a shortage of shooks in the near future.

The committee turned its attention next to the Bell Shipping Box Company. It discovered that the land, plant, and equipment were worth about $1,000,000. The plant and equipment were in a good state of repair and were capable of manufacturing approximately 8,000,000 shooks a year with a value of about $2,000,000. Furthermore the plant was conveniently located to serve the Bell Chemical Company's major factories. The general manager of the plant stated that under existing conditions, with the purchasing department buying over one-third of the company's shook requirements from independent shook manufacturers, his plant was unable to operate efficiently. He could not seek orders from outside sources because he could not meet competitive prices.

The general manager of the plant stated, furthermore, that if his plant was given the entire shook business of the Bell Chemical Company, the plant could operate on a basis which would permit the greatest efficiency and costs could be reduced. He estimated that if the subsidiary company could run on a full manufacturing schedule, it would lose about 5% on its operations, after all interest charges and administration expense, if it sold its products at competitive prices. This difference was caused primarily by the fact that, in line with general company policy, the Bell Shipping Box Company paid its employees higher wages than did competitive shook manufacturers.

The general manager argued, moreover, that by continuing the operation of the shook plant the company would have an assured source of supply close to the place where shooks were required; hence small stocks of shooks could be maintained without danger of shortage. Furthermore, if the plant was discontinued, aside from the loss incurred in liquidation of the physical assets, there would be a cost of approximately $115,000 to reimburse employees under annuity provisions of pension funds. The company also would have a certain moral responsibility to absorb the employees from the discontinued plant into the organization at some other point.

The purchasing director reasoned that his duty to the company was to obtain the materials required in the operation of the company at the lowest possible price, quality and service considered, and that unless his department performed on that basis it was not purchasing efficiently. He stated that if the subsidiary company wanted the shook business, it should meet competitive prices and that, if in so doing it incurred a loss, that loss was chargeable to the subsidiary company and not to the purchasing department; thus the inefficiency would show up where it had occurred. The purchasing director stated, furthermore, that if all the shook business were awarded to the subsidiary company, his company would be entirely dependent upon one source of supply and that if the shook plant were destroyed by fire or in any other way put out of production, the company would be inconvenienced greatly.

The vice president in charge of operations expressed the opinion that the primary consideration was the effect of the situation upon the company as a whole. Regardless of whether the purchasing department paid higher prices for shooks than were justified or whether the shook plant operated at a loss, the final result affected the profits of the company. Any solution to the problem, therefore, should be decided on the basis of how the company would be affected rather than either the shook plant or the purchasing department.

After considerable discussion the committee decided that, inasmuch as a downward trend in the use of shooks was assured and shook manufacturers probably would continue to have adequate capacity to fill all the company's needs, it would be for the best interests of the company to dispose of all the property, plant, and equipment of the Bell Shipping Box Company. Recognizing that a going concern has greater value and is, therefore, more attractive to a prospective buyer than one which is not in operation, the committee considered it advisable for the purchasing department to buy as much of its requirements as possible from the subsidiary company.

The committee recognized also that the purchasing department had contracts with shook manufacturers which would continue in force for approximately a year, but it expected that only the minimum quantities would be taken under the terms of the contracts and that, where possible, adjustments permitting the purchase of smaller quantities than those originally contracted for would be obtained. In order that the subsidiary company might make the best possible showing, it was decided to allow the shook plant to bill the Bell Chemical Company at cost plus shipping expense. The purchasing director objected to this practice as being fundamentally wrong, but as he was in the minority, his objection was overruled.

The president accepted the committee's report and expected the recommendations to be followed. The purchasing director, however, never had been in full accord with the recommendations.

In the fall of 1929 the purchasing director again complained of paying higher prices to the subsidiary company than were charged by other manufacturers. Further price reductions had been made by shook manufacturers, but the Bell Shipping Box Company had not reduced its prices. No aggressive efforts had been made to sell the shook plant as there appeared to be no buyers. The purchasing director took no further action at this time.

In the summer of 1930 the director of purchases again called the attention of both the vice president in charge of operations and the general manager of the shook plant to the fact that the prices charged by the shook plant were much higher than prices in the open market and that no progress had been made in the disposal of the shook plant. The committee's forecast regarding the company's use of shooks had been correct, and requirements were decreasing steadily. The general manager of the shook plant replied that he was helpless to reduce production costs so as to make them comparable with those of independent shook manufacturers because he was not permitted to lower wages. The president of the Bell Chemical Company was one of the industrialists who had promised President Hoover to maintain wage scales, and he had issued orders to all subsidiary companies not to reduce wages. Independent shook manufacturers were not bound by such a promise and had lowered wages, thus decreasing costs.

A compromise was reached in which the purchasing director agreed to pay the Bell Shipping Box Company a price equal to the highest price quoted by the independent shook manufacturers. The differential between the highest and lowest prices quoted by suppliers ran as high as 8%. The purchasing director, however, was still dissatisfied and firm in his belief that in buying materials the purchasing department should not have to pay a premium even to a company-owned subsidiary. The purchasing director estimated that the prices which were paid to the subsidiary company would cost the purchasing department about $16,000 more in 1930 than otherwise would have been necessary. On the other hand, the shook plant had at no time during the year received all the company's shook orders and had had to shut down completely for two months, operate at 30% for five months, and operate at 80% for the other five months. The loss for the year, after interest on investment was figured, amounted to $59,000. The executives decided to charge half of this loss to the parent company, as the action of the general purchasing department was partially responsible for the loss. This method of accounting for the loss would result in a more favorable showing of the operations of the Bell Shipping Box Company.

In December, 1930, the purchasing director was confronted with the problem of how to award 1931 contracts for shooks. He was undecided whether to award all the business to the Bell Shipping Box Company and, if so, at what prices. Prices quoted by independent shook manufacturers had decreased steadily and were 15% lower than they were at the time the committee had investigated the problem.

53. RALEIGH SIMONS COMPANY

PROPOSED DISCONTINUANCE OF PROCUREMENT BY MANUFACTURE

In 1936 the director of purchases of the Raleigh Simons Company, a large food producer, was faced with the problem of deciding whether to purchase 15,000 stainless steel hooks from one of its sources of supply or to have the machine shop of its central plant fabricate these stampings. The company's decisions to manufacture instead of purchase its own requirements of an item were always based on one or more of the following three reasons: (1) to insure an adequate and continuous supply (2) to keep costs as low as possible, or (3) to control the quality more satisfactorily.

The Raleigh Simons Company had grown from a single plant, in 1860, to an organization with many major and minor plants in 1936. In addition to processing a particular food line, the company made intensive use of all its by-products.

Because of the rather specialized nature of its product, the Simons company had, in its early days, been forced to enter the equipment production field. For example, the company had developed extensive cooling systems in its plants, as well as a refrigerator car system. Assembly lines were developed, and a type of machinery was devised for incorporation in those assembly lines. By 1910, however, the industry had grown to such a degree that several manufacturing concerns had become interested in its problems and were beginning to stock standard types of equipment regularly used.

The machine shop at the central Simons plant had been set up solely as a maintenance department, doing all minor repairs and any major repairs that it was equipped to perform. As the company expanded, the machine shop was constantly called on to furnish the new plants with items identical to those originally required by the central plant. With the increased demands on the machine shop, it was necessary to employ 50 men, 25 for plant maintenance work and 25 to repair old equipment and to make new equipment for the branch units.

In 1925, with the centralization of purchasing and the development of outside sources of supply, the policy of turning over to the machine shop all jobs that it could handle was changed and a new policy adopted whereby the shop was required to submit bids in competition with outside sources. Each shop bid was to be broken down according to the following classification:

1. Material costs, including unit of cost and total cost.
2. Labor costs, including rate of pay and estimated total number of hours required.
3. Overhead expense, charged at 28% of the total labor and intended to cover all equipment, supervisory, heating, and lighting costs.[1]
4. Store expense, charged at 3% of the total material costs and intended to cover the cost of packing and handling of material.[1]

For a time this policy had been successful because the equipment development department enabled the shop to operate at near capacity and consequently to get the bulk of the business on which it bid. During depression periods, however, the company received successively lower bids on its equipment contracts and in many cases placed its orders with outside sources.

By 1934 the volume of work done by the machine shop had declined by 30%. Faced with this situation, the master mechanic requested that when his quotation was high on a large job he be given an opportunity to refigure. The director of purchases believed that it was unfair to give any one source an opportunity to rebid, and that ultimately it would result in the curtailing of competition among the outside sources. On items not made by the machine shop, furthermore, the policy of the department was not to reopen bidding except in unusual situations. For example, when there was a wide range in prices quoted, all bidders were asked to review their figures, or when all the bids seemed unreasonable, they were thrown out and new quotations called for.

After considerable controversy, an agreement was reached whereby, in instances when the machine shop's actual out-of-pocket costs (labor and materials) as shown on the original bid were lower than the bids of competing firms, the shop would get the business at the lowest figure quoted. For example, if the lowest outside bid were $450, and if the labor and materials costs of the machine shop were given as $425, then the business would be placed with the shop at $450. After this plan had been adopted, it was found that in a substantial number of cases the shop's actual direct costs were above the bids of outside competitors. The master mechanic then requested an opportunity to do the work at the lowest competitive figure. The request was refused, and the jobs were given to outside sources. The director of purchases estimated that at least 50% of the orders for this class of equipment had been handled in this manner.

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[1] This figure was originally determined by the cost accounting department of the company and in 1931 had been reviewed and reapproved as satisfactory for control purposes.

In October, 1935, a member of the equipment development department designed a special stainless steel hook which was practical enough to place in use at all the plants. Specifications were drawn up and requirements were estimated at 15,000 units. Inquiries were sent out to four stamping concerns and to the machine shop. The following bids were received:

Company Machine Shop:		
Labor	$812 00	
Materials	397.00	
Actual cost		$1,209.00
28% shop expense		227.36
3% store expense		11.91
Total cost		$1,448.27
E. W. Jones Spring & Wire		1,000.00
Superior Wire Goods		1,120.00
Consolidated Steel and Wire		1,200.00

The E. W. Jones Spring & Wire Company, a large fabricator of diversified stamping and wire specialties, was anxious to enter the market for equipment for such firms as the Raleigh Simons Company. The Jones company had previously been the lowest bidder on other types of work for the Simons company, and its delivery service and quality of product had been excellent. In view of these satisfactory relations and of the fact that the lowest bid received was submitted by the Jones company, the director of purchases prepared to award it the business.

Before the contract was actually awarded, however, the master mechanic, having been advised that he was not to receive the business, came to the director of purchases and demanded that he be given the opportunity to take the business at the lowest competitive figure.

In justification of his demand, the master mechanic offered the following arguments:

1. *Costs.*—He felt that sufficient study had been made of the costs of operation and overhead in his shop to define clearly the average trend of costs, and that it was unnecessary to attempt to figure specific charges on each job.

2. *Price.*—The master mechanic believed that some competitors submitted bids out of line with their costs because they wanted to break into this field of business. He argued that such suppliers, having gained the confidence of the Simons company, would then be likely to raise the price in times of emergency, particularly if the machine shop was no longer available as an alternative source. The discontinued operation of the shop was felt by the master mechanic to be a real possibility unless its volume of business were increased.

3. *Quality.*—He believed further that, since the product was to be used by the Simons company, its own machine shop would make a more critical inspection than would an outside supplier. He could also be quite certain that the materials used would be in accord with the specifications as set forth. He seriously doubted whether the Jones company could furnish this quality at the prices quoted. Furthermore, the low bid might have been made with the intention of leaving the hooks in a partially finished condition, in which case the competitive figures were not comparable.

4. *Protection of the design.*—The master mechanic reasoned that by letting an outside source of supply furnish special items the company was throwing open to the industry any new ideas which it might have developed. By fabricating the hook in the shop, the style and type were kept entirely within the Simons company, and any benefits that resulted from this new unit would benefit only the Simons product.

5. *Experimentation.*—Whenever any serious problem arose, the mechanics of the shop, having spent all their time in the company, were better fitted to meet and cope with the matter at hand. In the past they had developed many of the machines used throughout the organization and so felt that they were better able to make revisions and improvements. Though the actual development of equipment had been shifted to a separate department, the shop was still interested in new machines and devoted much time to experimentation.

In this particular instance the master mechanic felt that if he was permitted to make the stampings, he might, while fabricating, work out a better type of hook and that, by being able to control production, he could make these improvements as they occurred to him. If the work was done outside, he would not be in a position to study the new item and thus his experience and knowledge would be of no benefit to the company.

6. *Labor.*—On this particular job the cost of labor amounted to two-thirds of the direct costs, and the master mechanic considered that the Simons company's primary obligation was to its own mechanics instead of to those of some other firm. He felt that his mechanics, while not handling stampings all the time, were well trained in all types of equipment fabrication and as proficient as any stamping firm's

men. It was a relatively slack period, and this additional work would enable him to keep from cutting down the working hours of several of his men. With his entire force at work, the shop was in a position to take care of any rush work that might develop. The master mechanic felt that, in times of severe emergency, his large mechanical force was very helpful, and in one or two instances they had all aided the maintenance men in keeping the large central plant functioning.

54. REDMAN COMPANY

OPERATION OF PRINTING PLANT BY MANUFACTURING CONCERN

The Redman Company, located in Stratford, New York, about 25 miles from a large city, manufactured a wide line of precision instruments. In 1925 the company purchased the plant of the Stratford Printing Company for the primary purpose of preserving the Stratford weekly newspaper. The problem of what should be done with the printing plant was not solved to the complete satisfaction of the company's officers during the course of the next several years.

The Redman Company was the principal business enterprise in Stratford, employing over 300 of the town's 5,000 inhabitants. Because of the Redman Company's important position in the town, the company's executives assumed a certain amount of civic responsibility and took considerable interest in the welfare of the company's employees. Early in 1925, when the local publisher of the *Stratford News* failed, the president of the Redman Company, at a meeting of the company's officers, suggested that it might be wise for the company to purchase the plant for the $10,000 asked, and to continue the publication of the newspaper. He pointed out that the newspaper was essential in maintaining the morale of the townspeople and therefore of the company's employees. The company would at the same time obtain a printing plant which could be expanded to take care of its own printing requirements.

At that time the printing plant was equipped to publish the newspaper and to do such simple commercial work as the printing of handbills. The plant had never done any of the Redman Company's printing because that company's requirements consisted primarily of such work as high-grade multiple color printing for catalogues and circulars or specialized printing for letterheads, forms, tags, and labels.

In 1924 the Redman Company spent approximately $10,000 for its printing work. This expense was allocated roughly as follows: catalogues, $7,500; direct mail advertising matter, $1,000; forms, tags, and labels, $900; and stationery items, such as letterheads and envelopes, $600. The company had satisfactory sources for all its printing requirements. In most instances orders were placed with concerns specializing in the type of work required. If the company purchased the printing plant, it could not hope to produce so economically its own forms, tags, or stationery as could the individual specialized shops. A further investment of about $4,000 in additional equipment, however, would make it possible for the plant to perform a large part of the company's catalogue and direct mail printing. Moreover, the capacity of the new equipment would be sufficient to permit the printing plant to solicit orders from outside companies.

The officers of the Redman Company decided to follow the president's suggestion. They believed that it was part of the company's obligation to its employees to maintain the town paper, and in their opinion $10,000 was a reasonable price for the equipment contained in the plant. Furthermore, they believed that investing the additional $4,000 would make the printing plant a profitable addition to the company's business. Upon its acquisition on June 1, 1925, the printing plant was set up as an independent unit of the Redman organization and was placed in charge of a man experienced in commercial printing. The functions of accounting, collecting, and purchasing for the printing division were to be performed by the service departments of the parent company at a cost to the division proportionate to the amount of work involved. Printing contracts with the Redman Company were to be obtained primarily on the basis of bids made in competition with independent printing concerns, although quality was of course also a major consideration. The manager of the printing plant was expected to publish the newspaper and to obtain sufficient commercial work, whether from the company or from other sources, to realize a profit for his division.

The printing plant operated at a loss during the three and one-half years ended December, 1928. (See Exhibit 1.) During this period several difficulties had been encountered by the printing plant. In the first place the sales and advertising departments had been critical of the quality of work turned out by the company's plant and for this reason had continued to place outside orders for some of the printing work which the plant was equipped to perform. Although the manager of the printing division realized that his opinion was not entirely unbiased, he believed that the pressure which had been brought upon the sales and advertising departments to patronize the company's plant rather than their former suppliers tended to make them overcritical of the work performed by the division. This criticism stressed minor defects that were common to all printing but that had been overlooked in the work of independent concerns. The plant manager pointed out that, since outside sales had steadily increased, the quality of work performed by the plant was apparently satisfactory to its outside commercial customers.

EXHIBIT 1
REDMAN COMPANY
Printing Division—Revenue and Operating Results
1925–1934

Year	Company business		Outside business		Newspaper business		Total volume	Operating result
1925*	$ 3,500	38.9%	$ 3,000	33.3%	$2,500	27.8%	$ 9,000	$3,000†
1926	7,700	37.6	8,700	42.4	4,100	20.0	20,500	5,000†
1927	7,900	32.9	11,800	49.2	4,300	17.9	24,000	3,700†
1928	8,000	29.6	15,100	55.9	3,900	14.5	27,000	7,640†
1929	13,000	37.1	17,700	50.6	4,300	12.3	35,000	244†
1930	15,000	34.5	23,700	54.5	4,800	11.0	43,500	2,415
1931	17,000	41.5	19,800	48.3	4,200	10.2	41,000	966†
1932	16,300	45.7	15,600	43.7	3,800	10.6	35,700	1,136†
1933	17,800	51.3	13,200	38.0	3,700	10.7	34,700	4,950†
1934	20,200	59.4	10,300	30.3	3,500	10.3	34,000	5,732†

* Six months.
† Loss.

A further difficulty encountered by the printing plant manager was that he had been unable to secure for the paper the advertising support of local merchants because of their resentment toward the Redman Company's policy of purchasing for employees. The company had followed the practice of buying almost any item which made possible a worth-while saving to the employees. In an effort to allay this resentment, the officers of the company altered the employee purchasing policy to include only those items which were not carried by local merchants. The one exception to this change of policy was the continued operation of a company-owned public garage where gasoline and tires were sold to employees at cost. However, in spite of the fact that local merchants were repeatedly assured that the company would no longer infringe upon their business, they maintained an attitude of distrust toward the company, which was reflected in less advertising in the *Stratford News* than would normally have been expected.

Early in 1929, in an effort to develop more extensively its commercial printing business, the Redman Company placed a new manager in charge of the printing division. After making a study of the company's printing business, the new manager concluded that the wise policy was to concentrate on high-class work, such as that in catalogues and advertising folders, rather than to attempt to cover a wider commercial market. After investigating the plant equipment, he recommended the purchase of a large Premier Cylinder press and additional smaller machines for cutting and small job work. This equipment would provide facilities comparable with those of the larger printing concerns. The recommendations of the new manager were followed, with the result that approximately $13,000 was invested in additional printing equipment.

The operating results of the plant and data on its volume of business from 1925 through 1934 were as shown in Exhibit 1.

After 1930 the printing plant manager on several occasions complained that the newspaper imposed upon the operations of his division a financial burden of from $3,000 to $4,000 a year. The increased difficulty experienced in obtaining advertising support for the paper among local merchants after 1930 had added to the burden of this item, while keener competition for outside business had resulted in both a narrower profit margin on work done and a decrease in the volume of outside orders for printing. The manager of the printing division contended that his plant did much of the company's work at a low margin, which enabled the company to realize savings on its purchases of printing. In addition, through publication of the newspaper, the printing division was performing a service which was considered of benefit to the employees of the Redman Company, even when the annual operating results of the division showed a loss of $4,000.

The Redman Company's annual expenditures for printing during the period from 1924 through 1934 were as shown in Exhibit 2.

For the years 1928 through 1930 it was estimated that approximately 40% of the company's total printing requirements, which could have been done economically in the printing plant, were sent outside. This work had been given to outside suppliers because members of the sales and advertising departments held an attitude of resentment toward the printing division. By 1932 this proportion had decreased to approximately 15%. In 1934 it was reduced still further, when the company's officers decided to compel the use of the printing division for all the printing requirements that the plant was equipped to perform.

EXHIBIT 2
REDMAN COMPANY
Total Annual Expenditure for Printing
1924–1934

Year	Purchase of printing from printing division	Purchase of printing from outside suppliers		Total expenditure
		Printing division equipped to do	Printing division not equipped to do	
1924	....	....	......	$10,893
1925	$ 3,500*	$ 5,267	$1,650	10,417
1926	7,700	3,977	1,850	13,527
1927	7,900	5,113	1,975	14,988
1928	8,000	9,412	2,100	19,512
1929	13,000	10,036	2,425	25,461
1930	15,000	10,555	1,975	27,530
1931	17,000	5,716	1,700	24,416
1932	16,300	3,117	1,375	20,792
1933	17,800	5,197	1,850	24,847
1934	20,200	2,486	1,900	24,586

* Six months.

The Redman Company's investment account for the printing division from July, 1925, the time of its purchase, through December, 1934, was as shown in Exhibit 3.

After the expansion recommended by the new manager in 1929, the major increases in investment in the printing plant came in 1931 and 1932. The 1931 expansion, which consisted of the purchase of a large cylinder press and auxiliary equipment, was undertaken as a result of the increased volume of business in the preceding years. Before the acquisition of this press, the plant had owned only one large cylinder press, purchased in 1929. Occasionally it had been necessary to suspend work in process in order to fill an immediate requirement. This was costly procedure because the resetting of work necessitated from two to four hours of skilled labor, during which period the press was out of operation. The new press not only obviated this costly procedure, but also permitted the printing plant to render better service to its outside customers and to offer additional capacity for this work. The investment made in 1932 was for replacement purposes only, since the machinery then acquired did not increase the plant's capacity but did add to its efficiency.

Exhibit 3
Redman Company
Printing Plant Investment—Undepreciated Assets Accounts
1925–1934

Year	Materials and operating supplies	Printing presses	Type	Furniture and fixtures	General equipment	Total
July, 1925	$ 282 08	$ 2,983 50	$1,471 34	. . .	$ 5,263 08	$10,000 00
Dec. 31, 1925	385 39	4,704 93	2,402 74	$179 50	6,503 39	14,175 95
Dec. 31, 1926	512 61	4,704 93	2,651 13	179 50	6,503 39	14,551 56
Dec. 31, 1927. .	616 71	4,704 93	2,930 24	201 50	6,540 89	14,994 27
Dec 31, 1928 ..	563 51	4,704 93	3,565 16	201 50	6,906 69	15,941 79
Dec 31, 1929 ..	2,213 04	9,319 14	4,481 86	383 79	12,479 09	28,876 92
Dec. 31, 1930 ...	3,242 40	9,319 14	4,871 93	383 79	12,537 09	30,354 35
Dec. 31, 1931	4,138.87	12,376 20	6,323 19	383 79	15,708 82	38,930 87
Dec. 31, 1932 ..	5,220 09	14,347.38	7,524 60	383 79	17,064 96	44,540 82
Dec. 31, 1933 ...	5,055 17	14,347 38	7,766 91	383 79	17,456 17	45,009.42
Dec. 31, 1934...	5,439.78	14,347 38	8,671.33	383 79	17,472 26	46,314.54

Ever since it had acquired the printing plant, the Redman Company had followed the policy of developing the outside business of the printing division as aggressively as possible. On several occasions a salesman had been employed to solicit commercial printing, but in each instance he was unable to secure enough business to repay the company for his salary and traveling expense. Because of these unsatisfactory experiences with full-time solicitors, the company decided to have the printing plant manager attend personally to the selling function of the printing business.

The printing division had not been advertised because the Redman Company management did not believe that the results of any advertising method available would repay the company for the expenditure incurred.

Company officials estimated that the costs of the printing division of the Redman Company were on the whole approximately 10% lower than those of its competitors, which were located chiefly in the near-by metropolitan area. The arrangement whereby the service departments of the company were available to the printing plant at a charge of its share of their costs permitted the plant to operate with less overhead expense than its competitors. Moreover, the plant, being located in a rural community, could employ cheaper labor than could metropolitan concerns. The management also believed, however, that the competitive situation existing in the commercial printing field after 1930 had tended to reduce the influence of cost in the determination of bids. A large part of the total printing business was, in their opinion, performed at prices below cost. Part of the decline in the volume of the company's outside printing business was attributable to its policy of refusing to quote prices that did not cover its cost of performing the work.

55. GIBBS COMPANY

INVESTIGATION OF MANUFACTURING COSTS BY PURCHASING DEPARTMENT

At various times in the five years preceding 1931 the purchasing department of the Gibbs Company, a large manufacturer of all types of apparatus, equipment, and appliances, had made investigations to determine whether parts or items which the company manufactured for use in its products were being made as cheaply as the same parts or items could be purchased from suppliers. These investigations had encountered objections from the manufacturing departments but had resulted, nevertheless, in substantial savings to the company. In 1931 the director of purchases was again called upon to make such a decision.

The Gibbs Company was an old and well-established manufacturer and was generally regarded as being ably managed. The company had extensive manufacturing facilities located in five states, and in so far as it had been practical the various plants had specialized in the production of related groups of the company's products. A very conservative policy had been followed in depreciating the company's plants and equipment. These items had been depreciated promptly and new equipment purchased whenever it was required. Although some of the buildings were over 20 years old, the equipment and the layout of the machines in general conformed to the highest standards of modern manufacturing practice.

All manufacturing operations of the company were under a vice president in charge of manufacturing. The purchasing department was also under this executive.

The company's purchasing department was located at the main plant and general offices in Philadelphia, Pennsylvania. The department was held responsible for buying all materials and supplies used by all the plants. The director of purchases, his assistant, 7 buyers, and 33 clerks and stenographers comprised the personnel necessary to perform the duties of the department in normal times.

Each buyer was responsible for purchasing a group of commodities in which he was expected to be an expert. In addition to current market news, a buyer was supposed to know the price history, the price trends, the available sources of supply, and the uses for each commodity, as well as the possible substitute materials. Furthermore, it was considered highly desirable that the buyer should know how the materials were manufactured, know something about their production costs, and keep himself informed of any new developments which were occurring in the industry.

The activities of the purchasing department consisted largely of making arrangements with suppliers whereby the company's stores department could place orders. In general all negotiations with suppliers were grouped into four classes as follows:

1. Providing standard order instructions.
2. Making quantity contracts.
3. Purchasing items which fluctuated continually in price, such as speculative metals and rubber.
4. Negotiating with suppliers for items requested by any department in the company, especially by the stores department.

With the exception of the third classification, the purchasing department had little to do with the actual placing of orders. This duty was performed by the stores department, a division of which was located at each of the various plants. The purchasing department furnished each stores division with what were known as "standard ordering instructions" for every commodity purchased. These instructions, which were placed on file cards, gave the name of the article or material, name and address of the supplier who was to receive the order, terms of delivery, terms of payment, and all other essential data. This information was revised whenever prices or other conditions changed.

The purchasing department itself placed all orders for materials which fluctuated widely in price. It was the company policy to procure materials in this class whenever advantageous buying opportunities occurred.

The purchasing department had the authority to choose the sources of supply, although selection of what materials to buy was made by the research department. After a product had been developed in the research laboratories, however, it was turned over to the engineering and production departments for manufacture. The engineering department compiled specifications which were submitted to the production department for comment on the adaptability of the specified material to the production facilities and which were also submitted to the purchasing department for comment in regard to commercial standards, trade customs, and general market conditions.

The company had no rule in regard to what proportion of the materials and parts which entered its products should be purchased and what proportion should be manufactured. In general the manufacturing and engineering departments had encouraged the making of all items which went into the company's finished products and which were in any way adaptable to the company's production facilities.

Perhaps the strongest incentive the company had had to manufacture all items possible had been the desire to control quality. From its inception the company had manufactured only the very highest quality of products. The quality appeal had been used as one of the major sales pleas. Another reason why some of the items which could have been purchased from outside suppliers had been made in the company's plants was that, at the time the need originally arose for the item, it was impossible to find a reliable source of supply. A further consideration in many instances where items of satisfactory quality could have been obtained from reliable suppliers was that by manufacturing the items in its plants the company was enabled to distribute the overhead burden over a greater volume of production than it otherwise would have had.

Usually, whenever it was decided to manufacture rather than to buy certain items, prices were obtained from suppliers in order to compare them with the company's estimated production costs. After it once had been decided to manufacture an item, however, no provision had been made for a periodic systematic check-up to compare actual production costs with suppliers' prices.

From time to time suppliers had submitted prices to the purchasing department, and in some instances these were checked against the company's cost of production for similar items. Often such comparisons had shown that over a period of years suppliers had been able to reduce their selling prices below the production costs of the Gibbs Company. As a result of some of these findings, pressure had been brought on the production department to reduce costs, and in some instances the company had ceased to produce the item and had begun to purchase it from outside suppliers. Substantial savings had been realized from many of these investigations.

In the fall of 1931 the buyer responsible for the purchase of drop forgings discovered that he could purchase from a reliable supplier a drop-forged part, which was used in some of the company's products, for 11 cents each. The part was being produced in the company's factories at a cost of 22 cents each. Investigation of the matter disclosed that in 1922, when the company first decided to make the drop-forged part, its production costs were lower than the prices quoted by suppliers. Since the original comparison of costs, the suppliers had improved their manufacturing technique, while the Gibbs Company had continued to use the old methods. The director of purchases believed that such a condition was natural, since the supplier specialized in the production of drop-forged parts and his whole interest and attention was centered in that job. The production of drop-forged parts by the Gibbs Company, on the other hand, was only incidental to its major activities, and special attention was not given to keeping the production methods up to date. Since the company required 400,000 of the drop-forged parts annually, it could effect a substantial saving by obtaining a lower cost.

The drop-forged parts were manufactured in a forge shop, located at the company's main plant, which was equipped with standard drop-forge equipment. A section of the shop was devoted entirely to the production of the drop-forged parts under discussion. Other drop-forge equipment was used intermittently to make special parts required in the construction of special-order equipment.

The director of purchases gave considerable thought to the situation discovered by the buyer. The price differential of 100% in this one instance led him to believe that there were undoubtedly other instances in which substantial differences existed. If this was true, clearly a definite policy should be adopted: either a systematic means should be provided within the purchasing department for discovering differences between suppliers' prices and the company's manufacturing costs or a decision should be reached that it was not the function of a purchasing department to determine the efficiency of the company's manufacturing operations.

In the past, whenever a buyer had discovered an instance of marked difference between a supplier's price and the cost of manufacture by the company, the production department had resented the investigation. The production executives had voiced the opinion that the purchasing department grossly exceeded its authority in investigating production costs. Often, however, these executives had had to admit that the findings of the purchasing department were correct and resulted in improving the production methods in question.

If the director of purchases decided to adopt a policy of checking production costs against suppliers' prices, it would be necessary to devise a systematic method of carrying out this policy. At the time the problem was considered, the purchasing department maintained the following records:

1. Price record cards were used to maintain a comparative price record of each item bought by the company. The information for this record was received from copies of the invoices.
2. Hollerith cards were used for maintaining commodity and reciprocity records. The punched tabulating cards provided the following information, obtained from copies of invoices and purchase orders:
    - *a.* The works or agency placing the order.
    - *b.* The vendor.
    - *c.* The invoice date.
    - *d.* The commodity code number, the unit of measurement for the material, and the total quantity.
    - *e.* The value of the order in dollars.
    - *f.* Provisions for special tabulations.
3. A file was maintained for each purchase transaction. Suppliers' quotations were kept in these files for three years and then discarded.

The director of purchases believed that any system which was set up should provide for periodic visits to the company's plants by his various buyers so that they could observe how materials were used in the various manufacturing processes. The director of purchases was assured of the approval of the vice president in charge of manufacturing for whatever policy he decided to follow.

56. NATLAND COMPANY

AVAILABILITY OF COST DATA IN DETERMINATION OF PROCUREMENT POLICY

The Natland Company manufactured special-order equipment, the average unit price of which was approximately $20,000. Annual sales varied from $1,000,000 to $2,500,000, while purchases normally averaged about 20% of sales. Although the machinery was manufactured on special order, some standard parts were common to a large portion of the entire line, and practically all completed units went through the same manufacturing process.

Whether the company should manufacture or purchase parts, either standard or special order, was a question which frequently had to be decided. Although the manufacturing department was the final authority on such questions, the purchasing officer was consulted in an advisory capacity and thus actually had a voice in making decisions. Frequently the question originated with the purchasing officer. At such times he sent out inquiries to manufacturers and obtained quotations on the item under consideration. If the part was being procured by purchase, the head of the manufacturing department reviewed the company's production facilities to determine their current utilization and adaptability to the manufacture of the part in question. He also computed the company's manufacturing cost by (1) estimating the number of minutes of direct labor necessary to manufacture the article, (2) applying a per minute cost developed by the accounting department which covered charges for direct labor and burden, and (3) adding the cost of direct materials.[1] The purchasing officer and the head of the manufacturing department then compared the purchase prices with the cost of manufacturing and thus arrived at a decision.

In 1935, for instance, the Natland Company received a special order for equipment which required, among other parts, 15 pans made of 1/32-inch sheet steel with two loop handles made of 3/8-inch steel rod, one spot-welded to each end. The pans were to be 23½ inches long, 10½ inches wide, and 6 inches deep. The purchasing officer submitted drawings and specifications to a sheet metal working company located near by and received a quotation of $18 for the 15 pans. In the meantime the manufacturing department requested the accounting department to determine the cost of making these pans in its own plant. The accounting department submitted the figures given in Exhibit 1.

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[1] See H. Hamilton Church, *Manufacturing Costs and Accounts* (New York, McGraw-Hill Book Company, Inc., 1929), Chaps. XVIII–XXII, esp. pp. 326–348.

Exhibit 1
Natland Company
Cost of Manufacturing Pans
(15-unit lots)

	Pan	Handle
Setup time allocated to each unit (minutes)	1.1	1.1
Manufacturing operation (minutes)	40.2	11.0
Total time per unit (minutes)	41.3	12.1
Cost per minute	$ 0.026	$ 0.026
Cost of operations on each unit	$ 1.0738	$ 0.3146
Material cost per unit	0.34	0.02
Cost of unit	$ 1.4138	$ 0.3346
Cost per pan	$1.4138	
Cost per pair of handles	0.6692	
Total cost per pan (including handles)	$2.0830	

Since the quality was satisfactory in both instances, price was the important consideration. The purchasing officer and the head of the manufacturing department, however, believed that the company's cost system was inadequate for their purposes. (1) The figures obtained by the company's cost system gave no indication of how much of the manufacturing cost was made up of direct expense or how much was made up of burden costs. (2) Under the existing system, machinery that required an unusually large investment by the company or that was expensive to operate was not charged with an amount sufficient to cover the entire cost of its operation. (3) Although the average wage paid direct labor in the plant was approximately 69 cents an hour, there was a variation of from 60 cents to 80 cents in the hourly rates of individual laborers. The cost accounting system of the Natland Company made no allowance for such variations in determining the cost of a specific operation.

The officials of the accounting department acknowledged that the cost figures obtained were not entirely satisfactory for all purposes. They did not believe, however, that the occasions when more accurate and detailed costs were desired were of sufficient importance to warrant a change in the system, which had been designed primarily to afford cost control rather than to develop accurate costs of past production. In operation the company's system functioned as a standard cost[1] system. Since the company's products lacked standardization, the cost of a predetermined minute's production was used as a standard unit. The procedure, in determining the standard unit cost, had been (1) to total all direct labor and overhead expenses incident to the company's operation on the amount of production considered normal for a year, and (2) to divide this total by the aggregate number of minutes of direct labor which had been predetermined as necessary to produce that volume. The resulting rate had thereafter been used to cover all elements of cost except that of direct materials. Each item manufactured was then assigned a standard time allowance for its production; this allowance was determined on the basis of past experience in the manufacture of regular parts and on the basis of estimates for new parts or unusual production. The standard time allowance in terms of minutes multiplied by the standard unit cost plus the cost of materials then became the standard cost of the item.

Cost control was exercised by the accounting department in two ways. First, current production was constantly checked to determine whether the actual time required for each operation conformed to the standard time allowance for that operation. Off-standard performance was immediately investigated for the purpose of taking steps to remedy inefficiencies. Second, at the close of each fiscal period the variance between actual cost and standard cost for production completed during the period was analyzed in detail, and again off-standard performance was studied in order to take necessary corrective measures. The advantage of this system over one concerned only with actual historical costs was that inefficiency or subnormal operation was indicated immediately. Furthermore, attention was required at only those points of production where off-standard conditions were found.

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[1] See Charles Reitell, *Cost Accounting* (Scranton, Pa., International Textbook Company, 1933), Chaps. XXXI–XXXIII, esp. pp. 357–359.

In commenting on the justification for using the same rate throughout all departments of the plant, a member of the accounting department made the following statement:

> It is admitted that a cost system which uses machine rates would give a more accurate cost on individual operations and parts, but even then there is the possibility of shifting the operation from a machine having a low rate to one having a high rate, or vice versa, if it becomes necessary to meet a quick delivery.
>
> We do not feel that it is even necessary to have an individual department rate. Six departments produce practically all of our work; four of them have an average wage rate of 69 cents an hour, one of 65 cents and one of 71 cents. The overhead factor varies little between departments. The individual wage rates vary from 60 cents to 80 cents an hour, and they are not based entirely on the type of operation or class of work. The same operation may be done by a 60-cent man at one time and by an 80-cent man at another time.

An official of the accounting department suggested that the purchasing officer and the head of the manufacturing department, when deciding whether to buy or to manufacture, should compute the company's cost in the usual way and then estimate in each instance what part of this cost was made up of fixed burden. The accounting department was willing to assist in figuring the cost in this way but admitted that an estimate would be the most it could offer.

The purchasing officer did not believe that this procedure would eliminate the difficulty. In his opinion, the cost system was adequate for the accounting department since it successfully allocated the company's total costs to total production. In the case of a specific part, however, he believed that the cost figure obtained was based on an average so broad as to be meaningless.

57. HORTON INSTRUMENT COMPANY

COMPARATIVE COST OF MANUFACTURING VERSUS PURCHASING

In 1934 the purchasing officer of the Horton Instrument Company was considering whether any of the parts and supplies manufactured by his company for use in its production might be procured more economically from an outside source. One of the items which the purchasing officer analyzed was a small brass stamping.

The Horton Instrument Company was a pioneer in the manufacture of precision instruments and had therefore found it necessary to set up manufacturing facilities for practically every part required in its production. As time went on, however, manufacturing companies were organized which produced items used by the Horton Instrument Company, and frequently they were able to sell such items below the Horton company's cost of production. As a result, the officials of the company were from time to time faced with the problem of whether to continue the manufacture of certain parts or to buy them from outside sources.

This question arose in connection with a small brass stamping which was produced by the company in four sizes and was used to enclose instruments as a protection during movement within the plant and later as a shipping container. Although the nature of the company's product was such that quality was usually the primary consideration in determining whether to buy or to manufacture parts or supplies, the principal consideration in this instance was price. Quality considerations ended with the assurance that the container fitted the instrument closely enough to prevent shocks to delicate mechanisms during transportation.

Three manufacturers who specialized in this type of product and were reliable suppliers of other items purchased by the company were given samples of each stamping and requested to quote prices on lots of 10,000 units. Their quotations were received, and in accordance with the custom of the industry, a tool cost was included in each quotation. This charge, which represented the cost of special tools required to produce the article, was made against the buyer at the time of the first delivery. The supplying company was thereby able to quote prices that did not include an amortization charge.

The Horton Instrument Company was producing all four sizes of stampings. The company's cost figures included direct material, direct labor, and factory burden. The last item was charged at 150% of the direct labor cost, while materials averaged 11% of the total cost.

On the basis of the past usage record of these items, the purchasing officer determined annual usage figures (see Exhibit 1) which he compared with the quantity of each size of stamping that the company would have to buy in order to realize a saving over its manufacturing cost sufficient to meet the tool cost. The purchasing officer's decision was that the company should buy size 3 stampings from Supplier A, but that it should continue to manufacture the other three sizes in its own plant.

EXHIBIT 1
HORTON INSTRUMENT COMPANY
Cost Analysis of Brass Stampings
(10,000-unit lots)

Size	Supplier A		Supplier B		Supplier C		Company, cost per thousand*
	Price per thousand	Tool cost	Price per thousand	Tool cost	Price per thousand	Tool cost	
1	$7.25	$265	$6.00	$415	$6.70	$160	$7.91
2	8.50	265	6.00	435	6.90	175	7.43
3	5.50	290	7.40	525	7.50	185	9.55
4	5.50	260	7.40	435	6.10	135	4.52
	Quantity necessary for saving to pay tool cost						Annual usage
1	401,500		217,300		132,200		60,000
2	....		304,200		330,200		25,000
3	71,600		244,200		90,200		250,000
4	....		....		....		40,000

* Includes direct material, direct labor, and factory burden.

58. DAVIS MANUFACTURING COMPANY

DETERMINATION OF PROCUREMENT POLICY ON PRICE BASIS

The Davis Manufacturing Company produced an extensive line of metal products, including a great variety of items ranging from pins, metal buttons, and novelty goods to tubes, bar stock, and heavy metal sheets. The company annually expended several million dollars in the procurement of the 8,000 items required in its operation. In 1932 the purchasing officer of the Davis Manufacturing Company took over the supervision of the company's box factory. An examination of the company's cost of production for one size of barrel raised the question of whether the company should manufacture its entire requirements of barrels.

In the early years of its operation, the Davis Manufacturing Company had set up its own box-making facilities for the purpose of producing those wooden boxes which were so varied in size and shape that standardization among them was impossible. The company's entire wooden packaging requirements necessitated an expenditure of about $50,000 a year. Of this amount, approximately $20,000 was spent for finished boxes and barrels; $15,000 for the raw materials which went into the company's manufacture of boxes; and $15,000 for manufacturing costs in the box factory.

Before 1932 the box factory had operated under the general supervision of the maintenance department, not because any close relationship existed between maintenance work and box making, but because the box factory was not interrelated with any other department. Since, however, the purchasing department was responsible for the control of raw materials, including those used at the box factory, it did, to some extent at least, exercise supervision over the box factory. In 1932, therefore, the purchasing officer requested that the box factory be placed completely under his control. This request was granted, and the buyer of lumber and shooks was made directly responsible for the operation of the plant.

Realizing that the control of operations in the box factory had been rather lax for some time, the buyer investigated production costs and facilities to determine whether any of the items being manufactured could be purchased at a saving and whether any items then being purchased could be manufactured at a lower cost. During his investigation, the buyer found that the largest size of barrel used by the company was being both purchased and manufactured. This barrel, known as a sugar barrel, was made with a 28-inch stave and a 19-inch head and was used as a shipping container for some of the smaller and lighter products of the company.

For a number of years, sugar barrels had been purchased from barrel dealers who collected them after they had been used for sugar shipments. The company had to do some reconditioning work on them before it could use them. In later years, as a result of the increase in the use of cardboard packages by sugar manufacturers, the supply of these barrels had fallen off. Because of this situation, equipment had been installed in the box factory so that the company could manufacture enough barrels to meet the shortage in supply. Annual requirements of this size of barrel approximated 15,000 in 1925, and 6,000 in 1933. The company normally required about 9,000 sugar barrels a year. Of the monthly requirements of 500 barrels in 1933, only about 300 could be purchased secondhand. Because of the cost advantage derived from purchasing all the available secondhand barrels and manufacturing only enough to complete its requirements, the company had consistently followed this practice.

EXHIBIT 1

DAVIS MANUFACTURING COMPANY

Cost of Reconditioned Secondhand Barrels

	Cents
Price of barrel	45.00
Materials	1.70
Labor	2.88
Overhead	3.75
Total	53.33

The purchase price of secondhand barrels and the cost of reconditioning them was 53.33 cents. (See Exhibit 1.) The cost of manufacturing new barrels, which were more satisfactory because they were cleaner and more dependable, was 58.5 cents. (See Exhibit 2.)

Overhead was charged at the rate of 140% of direct labor. Looking back over the cost records which were kept by the box factory foreman, the buyer found that in January, 1930, this rate had been increased from 30% to 100% of direct labor; in February, 1931, to 120%; and in September, 1932, to 130%. The rate at which overhead was to be charged was determined by the comptroller's department. The increase in 1930 had been due to the shrinkage in volume throughout the box factory and also to the realization that burden expense had not been met by the former rate. Subsequent increases had been due to further declines in the box requirements of the company caused by the general falling off in the company's business. A substantial part of the box factory's overhead was made up of depreciation and carrying charges on the factory building. This building had cost nearly $40,000 in 1917 when it was constructed, but in the buyer's opinion it would not be worth more than $10,000 if reappraised. The book value of the factory in 1932 was approximately double that amount. Since it was essentially on a price basis that the company was determining its policy for procuring packaging supplies, the purchasing officer believed that the inaccuracy of the book value should be taken into consideration.

EXHIBIT 2

DAVIS MANUFACTURING COMPANY

Cost of Manufacturing New Barrels

	Cents
Materials	32.3
Labor	11.4
Overhead	14.8
Total	58.5

59. HOPKINS ELECTRIC COMPANY (A)

METHOD OF PURCHASE OF FABRICATED PART

The Hopkins Electric Company of Buffalo, New York, produced electrical equipment for homes. An important item in its line was an electric refrigerator. Although the company's own plant performed most of the operations making up the complete manufacture of the refrigerator from raw and semifinished materials, a few of the parts incorporated into the product were purchased from outside companies. In 1936 a change in the design of the refrigerator brought up the question of the most economical method of obtaining certain of these parts.

The evaporator door of the refrigerator, that is, the door to the ice cube compartment, was hung on two hinges. In the models manufactured prior to 1936, each of the two hinges had been suspended by a pin that was machined on one end and had a head on the other. These pins were the same size in all the refrigerator models made by the company and could be manufactured on a "header"; they were purchased, therefore, from a nail manufacturer. The pins were made of monel metal, a staple item on which the producer did not make price concessions.

The design of the 1936 refrigerator required a single pin for both hinges of the evaporator door; the change in design had been made in the belief that the strength of the part would thereby be increased. The use of a single pin necessitated using three different lengths for the different door sizes. As the new pins had to be machined on both ends, they could not be made by nail manufacturers but instead would have to be made in a screw-machine shop.

The material for the new pins was described as "⅛-inch round, 18-8 stainless steel, ground and polished." The base price for this stainless steel was 24 cents a pound, but the "extras"[1] involved in meeting buyer's specifications brought the price of the wire up to 63 cents a pound, and there was an additional charge of 2 cents a pound for cutting the wire into 12-foot lengths, making a total of

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[1] For examples of the "extras" included in the prices set by steel manufacturers, see case of the Marquardt Steel Company in *Problems in Marketing*, by Edmund P. Learned (New York, McGraw-Hill Book Company, Inc., 1936), p. 424.

65 cents a pound. Twelve feet was the maximum length that could be handled easily in shipment, as well as the length that could be cut into the three sizes of pins with the least amount of scrap. As this same kind of wire was used for the spokes of steering wheels in the de luxe models of a large automobile manufacturer, the wire was being produced in such large quantities that the "extras" were out of proportion to the actual costs involved. The motorcar producer obtained a substantial discount on this item.

The purchasing officer of the Hopkins Electric Company decided to compare the cost of having the pins machined by a screw-machine shop from steel furnished by the Hopkins company with the cost of obtaining the pins on the usual basis, whereby the supplier furnished the steel and included that cost in the price of the completed product. The purchasing officer accordingly obtained a quotation from the Finley Steel Corporation, from which the Hopkins company had bought large quantities of stainless steel in the past. On the quantity needed to supply the Hopkins company's requirements for the season, the Finley corporation offered a discount of 6 cents a pound off the list price, although the quantity was not nearly large enough to justify such a discount on that basis alone.

The purchasing officer of the Hopkins company then asked the Keenan Metal Products Company, which had been a satisfactory supplier of parts in the past, to offer two bids, one on pins for which the supplier itself furnished the material, and the other on pins for which the supplier did the fabrication only, the Hopkins company furnishing the steel. The bids submitted by the Keenan company for the three sizes of pins were as follows:

	Size of pins		
	$4\frac{33}{64}$ inches	$5\frac{57}{64}$ inches	$7\frac{33}{64}$ inches
Lot size	50,000	35,000	10,000
Price for the pins (per 100)	$2.31	$2.78	$3.62
Price for fabrication (per 100)	0.94	0.99	1.32

Engineers of both companies estimated that scrap would amount to about 15% of the steel wire used. The wire weighed 0.042 pound per foot. On the basis of the above figures the Hopkins company could get the pins at a cheaper price by accepting the Keenan bid on fabrication only.

The purchasing officer of the Hopkins company thought that the Keenan company probably was not aware that the wire could be bought for less than 65 cents a pound. Although the Keenan company did not plan to buy from the Finley Steel Corporation, he believed there was little doubt that the former company could have obtained the same discount from its supplier had it tried to do so. The bid of the Keenan company was not questioned by the officers of the Hopkins Electric Company, however; they were unwilling to reveal the price quoted to them by the Finley Steel Corporation, inasmuch as granting the discount was considered to be a favor.

The Hopkins Electric Company decided to accept the bid on fabrication only, and gave the Keenan company an order to make 95,000 pins, distributed by size groups according to the figures shown above. The same prices were to apply to any subsequent orders during the season. The Hopkins company ordered the steel from the Finley Steel Corporation, requesting that it be shipped by prepaid freight to the Keenan company and billed to the Hopkins company.

When the pins were made, the scrap amounted to almost 25% instead of the estimated 15%. As a result, the total cost of the pins was increased almost to the price originally quoted for the pins by the Keenan company. Officials of the Hopkins company thought that the scrap percentage was much too high and asked for an adjustment. The Keenan company replied that it had kept the scrap percentage as low as possible and suggested that subsequent orders be placed on the other basis of having the Keenan company furnish the material. The purchasing officer of the Hopkins company was confident that there was no dishonesty involved, because he considered the Keenan Metal Products Company to be a thoroughly dependable concern. Nevertheless, he was inclined to think that he should have been somewhat more insistent on obtaining an adjustment on scrap account, although the aggregate amount involved was not large. The Hopkins company did not request an allowance for the value of the metal scrapped, which was between 15 cents and 20 cents a pound, although the higher percentage of scrap increased the profits of the transaction to the Keenan company.

Because the long pins used in the 1936 refrigerators had cost more than had been estimated and because the use of these pins had not resulted in a noticeable improvement in the model, both the production department and the purchasing officer of the Hopkins Electric Company requested that the company change back to the type of pin previously used. In accordance with this request, the 1937 refrigerators were designed to use the old type of pins, so that the long pins were thenceforth needed only for servicing the 1936 models. Despite the fact that the price on small service orders was much higher than the prices previously quoted on larger lots, the purchasing officer did not consider it worth while for the Hopkins Electric Company to purchase the steel for these small orders. He therefore ordered the pins from the Keenan Metal Products Company on the usual basis of delivered price including the material.

60. HOPKINS ELECTRIC COMPANY (B)

SOURCE OF PURCHASE FOR FABRICATED PART

The Hopkins Electric Company of Buffalo, New York, produced a line of consumer goods which included refrigerators. Technically the most important part of the refrigerator unit was the rotor. Manufacture of the rotor included both rough and finished machining of steel. Ordinarily the Hopkins Electric Company manufactured the rotors in its own plant, but in 1937 it was obliged to have the rough machining on some of these parts performed by an outside company.

Manufacture of the rotor involved difficult engineering problems. It had to be machined to very close tolerances; a large amount of metal had to be cut away; and in the later stage of manufacture the metal had to be hardened so as to wear properly. No steel was known which had all the desired properties, although one steel company had been experimenting with the development of such a material for the Hopkins company. The steel that had been developed as a result of this experimentation was not considered ready for general commercial introduction, and the steel company was not eager to sell it to any firm other than the Hopkins company.

Like many parts manufactured by the Hopkins company, the rotor could not be produced by the company's rough machining facilities as fast as its assembly line could run. The company, therefore, customarily manufactured this part in advance of requirements, at times when the assembly line was not running. In 1936 it had been necessary to have approximately 7,500 rotors made by an outside supplier. Because the Hopkins company was obliged to purchase the rotors on short notice, it had not had time for full exploration of possible sources. It had given the order to the Morton Company, which had charged 24 cents apiece for the rotor part rough machined. The Hopkins company's own cost for the rough machining operation, based on the use of special-purpose machinery and five years' experience, was only 3 cents or 3½ cents. The cost of the steel delivered to the Hopkins company was 6 cents per pound, and about 2.4 pounds of steel were required to make a rotor, although half or more of this quantity was cut away in the machining.

During 1937 the company found itself with a small inventory of rotors, a rough machining capacity to produce 900 rotors a day, and orders which would keep the assembly line running at its capacity of 1,200 a day for most of the season. The company did not consider installing additional special-purpose machinery to increase its rotor production capacity, because its engineering department was working on the design of a new rotor which would require much less machining than the one being made currently and which was expected to be available for use in 1938.

The officials of the Hopkins company decided, therefore, to have an outside company perform the rough machining operations on the rotors which they did not have sufficient capacity to produce. The officials estimated that the company's total requirements of rotors would be about 250,000, and that 25,000 of these would have to be machined outside. The finished machining on the rotors would be done as usual in the company's own plant because the final operations could be performed at a faster rate than was possible for the rough machining.

Before placing an order for its 1937 requirements, the Hopkins company asked the Morton Company to quote a lower price than its previous charge of 24 cents a rotor. The Morton Company maintained, however, that the price could not be lowered. Consequently the Hopkins company placed an order for only 5,000 rotors with the Morton Company. For the remainder of its requirements, the Hopkins company invited a bid from the Keenan Metal Products Company, a supplier from which it had previously purchased other machined parts and which it considered thoroughly reliable. The Hopkins company stipulated that it would bill the total amount of steel required to the Keenan company at its own cost of 6 cents a pound; the material was to be of the same type as that used by the Hopkins company and was to be shipped directly to the latter company from the steel supplier. This arrangement would prevent any dispute as to allowances for scrap.[1] On the basis of the Hopkins company's figures for cost of steel and quantity of steel required per rotor, the Keenan company quoted a price of 21 cents for the finished part. The purchasing officer of the Hopkins company accepted this bid on a trial order basis of 5,000 rotors, with the provision that if the rotors produced on the trial order were satisfactory, he would give the Keenan company the balance of the order.

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[1] See Case 59, Hopkins Electric Company (A), p. 417.

The Hopkins company discovered that the main reason for the difference in prices quoted by the Morton Company and the Keenan company was that the former had been machining the parts on a four-spindle automatic machine whereas a six-spindle machine was required in order to obtain the maximum economy and efficiency. The Hopkins company's own low cost figure included merely direct labor and factory burden; the prices quoted by both suppliers included their profit, freight, and administrative burden charges.

The Keenan company experienced considerable difficulty in making the parts, although engineers from the Hopkins company were sent to the Keenan plant to give instruction in the proper methods and tools to be used. Production of the rotors was so slow that at times the continued operation of the Hopkins company's assembly line was threatened. Between two and three months were required to run the first 5,000, and rejections on this quantity ran about 25%. Some of the rejected parts were remachined at the Hopkins company's plant, some were returned to the Keenan company for remachining, and some were scrapped; the cost in all cases was charged to the Keenan company. At the end of the season, the Keenan company apparently had learned how to make the part and was able to maintain the required rate of production.

SECTION VII

PURCHASE OF EQUIPMENT

61. MILLSON COMPANY

PURCHASE OF HEAVY MACHINERY

Late in 1930 the Millson Company was bidding on a contract for the construction of 75 special heavy-duty, electrically driven machines for the Standard Company. Fulfillment of this contract would require the boring of a 30-ton casting. The company's engineers decided that this operation could be performed in one of two ways: by the use of standard boring equipment which the company had or could obtain as a standard machine tool; or by having a tool built which would specialize on the particular operation and which would not be suitable for any other work. The director of equipment negotiations was the buyer for all machinery and equipment.

The Millson Company manufactured all types of heavy electrical equipment for use in all major industries. The executive offices and the main plant were located in Chicago; six branch plants were located in Delaware, Pennsylvania, Ohio, New Jersey, Massachusetts, and Michigan. Each plant specialized as far as possible in the manufacture of specific groups of the company's products. For instance, one plant specialized in the building of turbines and another in the production of electric motors. Each plant was in charge of a plant manager, who was responsible for all the activities of the plant and reported to a general works manager at the home office. The latter, in turn, reported to the vice president in charge of manufacturing.

Annual sales of the company's products approximated $75,000,000. A world-wide sales organization, with offices in the principal cities, sold directly to users, wholesalers, and jobbers. Most of the salesmen had technical educations and had received additional training in the company's plants. About 65% of the total sales volume represented products which were built specially to the buyers' orders.

Each of the company's plants had its own purchasing department, headed by a purchasing director who was responsible to the plant manager, but whose purchasing policies were under the supervision of the general purchasing director. The general purchasing director, who reported to the general works manager, was in charge of the general purchasing department located at the Chicago plant. This department purchased all materials for the Chicago plant, bought all materials used commonly by two or more of the plants, and checked the prices paid for materials by the plant purchasing departments. The general purchasing department was organized for buying on a commodity group basis, with a buyer in charge of each of the following groups: iron and steel; nonferrous metals; fabrics, paper, office supplies and equipment; electrical supplies and equipment; castings; lumber and foundry supplies; maintenance materials and supplies; and small tools and tool steel. The purchase of machinery and equipment did not come under the direct jurisdiction of the general purchasing department but was performed by a buyer who had charge of a department organized specially for the purchase of these items.

This separate buying of machinery and equipment had its origin in the early history of the company. From the time of the inception of the company in 1870, the buying of machinery and equipment had been regarded as a different problem from the purchase of the materials and supplies required in the manufacture of the products. When the company was very small and had only one plant, the plant manager had made all expenditures for the capital account. The purchasing department, under a purchasing officer, had been confined to the routine buying of materials and supplies entering into the manufacture of the products. There were perhaps three major reasons for this division. The first was that the large amount of special-order business often required the purchase of special equipment. Second, the manufacturing operations required in making the company's products demanded large and complicated machines which involved capital expenditures of major importance. Third, the purchase of machinery required a technical knowledge which the buyers of supplies and materials did not possess. In 1930 the purchase of machinery and equipment had come to be the function of a machinery and equipment buyer, known as the director of equipment negotiations, who reported to and worked under the direct supervision of the general works manager.

Close cooperation existed, however, between the general purchasing department and the director of equipment negotiations.

The system which had been developed to purchase machinery was briefly as follows: The director of equipment negotiations was located at Chicago. He was expected to buy all the major equipment used by all the plants. His office maintained a record of all the equipment in the company's seven plants, giving all necessary information pertaining to the character of machines, types of drive, purchase price, date of purchase, location, and final disposition. A file was maintained of all circulars, catalogues, and advertising matter pertaining to all types of manufacturing equipment. This department endeavored to keep the plant executives who were interested in various types of manufacturing equipment advised on all new developments in the equipment. Whenever purchases of equipment were to be made, this department carried on the negotiations with the supplier and passed the necessary information along to the interested department in the plant.

Each plant had a manufacturing equipment department, which reported to the plant manager. This department devoted its entire time and effort to the study of manufacturing methods and equipment. The work of the department was carried on by two divisions of the personnel; the members of one division were concerned with the methods used in the manufacturing process, and the members in the other division focused their attention on problems concerning the equipment used in the manufacturing process. The members of the latter division were classified as follows: general demonstrators who dealt with all classes of machines, and demonstrators who specialized on one class of machines. All demonstrators were expected to be familiar with all new equipment which was capable of improving or replacing the machines under the observation of the demonstrators.

The demonstrators instructed new operators, made demonstrations showing new technique, and continually sought to improve methods and to lower manufacturing costs. When new tools which differed in any respect from equipment in use were purchased, the demonstrators were expected to test the new equipment and to determine its ability to perform the work for which it was purchased before the equipment was put in use in the operating department.

Various demonstrators were in competition with one another, as certain types of machines were suitable to perform the same operation, and it was the duty of a demonstrator to show by actual results that the machine he represented was best suited for the service intended. The general works manager believed that this arrangement resulted in beneficial comparisons such as that between milling machines and surface grinders, and between engine or turret lathes and vertical mills. The demonstrators were expected to recommend new equipment or changes in existing equipment whenever in their opinion economies would result.

In addition to the demonstrators, a group of men known as machine tool supervisors studied the condition of the machinery in operation. Each supervisor reported to the superintendent of a department and was expected to have a complete knowledge of the machines in that department with respect to their condition and suitability for the work. Every three months the supervisors made a physical review of the equipment, and at such a time the supervisors, through their superintendents, advised the plant manager as to the condition of machinery in use and as to the needs for new equipment. This inspection brought to the plant manager's attention any need for equipment to increase production, to replace equipment not entirely suitable for the work, or to replace worn-out equipment.

To aid the supervisors in recommending the proper tools, a record was maintained in the machine repair department which showed all repairs made to each machine. This record often pointed out weaknesses in the various tools, as frequency of repair to certain parts indicated improper design. Moreover the record indicated also abuse of the machine through improper care, such as lack of oil.

All requests for equipment were submitted to the plant manufacturing equipment department on forms which provided for a description of the equipment requested and included a list of five reasons for the request with adequate space to go into detail. These five reasons were increased production, saving in cost of manufacture, replacement, change in design, and new line of products. Having these requests go through one central department in a plant made it possible to consider the requirements of the plant as a whole and thus to transfer a machine which had served its purpose in one department to another department where it could be used to advantage.

If the manufacturing equipment department and the plant manager approved a request, it was forwarded to the director of equipment negotiations in Chicago, and he immediately took the active steps necessary for purchase. As the purchasing negotiations progressed, the plant executives interested in the transaction were kept informed concerning the developments. Each plant manager was allowed a fund for equipment expenditures in the annual budget. This sum was based on past experience and future plans. Expenditures had to be approved by the treasurer and the vice president in charge of manufacturing.

In the fall of 1930 the heavy electrical machinery division of the sales department was making estimates on the specifications for some heavy electrical machinery desired by the Standard Company, which was revising certain of its productive facilities. The specifications called for 75 heavy-duty machines, the total sale price of which was expected to be about $6,500,000. Five companies had been invited to bid on the order, and it was anticipated that, if the prices were reasonably close, at least three of the companies would share the order, as it was the policy of the Standard Company to divide its business so as to benefit from reciprocal relationships. In the case of this order, furthermore, it would be impossible for any one company to complete the entire order within the specified 10 months' time limit. The Millson Company had reason to believe that if its prices were in line with the quotations of the other companies it would receive an order for 30 of the machines.

The sales department turned the specifications over to the design engineering department, which drew up preliminary plans of equipment meeting the specifications. These plans were submitted to the plant manufacturing departments so that they might estimate the various operations required and thus figure costs, and also so that they might suggest changes in the design which would permit more economical manufacture. The plans and suggestions were then returned to the designing department and final drawings were compiled. The final drawings were returned to the shops to be studied by the demonstrators and machine-tool supervisors, in order that they might determine what small tools, jigs, and fixtures were requested and what machine tools were needed to manufacture the product indicated in the design. During this study the problem arose as to how one of the major parts, a 30-ton frame casting, was to be bored. The men who were making the study of this manufacturing operation recognized that there were two ways of performing the operation. The first, and the least costly from the standpoint of capital investment, was to use the existing plant equipment, which was a large-size standard horizontal milling machine, and a large-size vertical boring mill. The second way was to have a machine tool constructed which would specialize in the performance of this one operation.

The production executives believed that it was advisable to attempt to produce the equipment for the Standard Company on a production line basis. Such a method would be a radical departure from the procedure which the company had followed in the past and from that used by competitors, but it was believed that substantial economies would result. If this proved to be true, the Millson Company believed it would be in a better competitive position to bid a lower price on the Standard Company's order as well as to bid on similar equipment when competitors of the Standard Company undertook to modernize their facilities. The sales department anticipated that within the next five years the competitors of the Standard Company would be in the market for equipment similar to that being ordered by the Standard Company.

The machine tool supervisors and demonstrators realized that in a production line method of manufacture the different operations had to be so timed that there was a smooth and steady flow of work. The production time, therefore, had to be determined for each operation and then arrangements made to speed those operations which were the slowest, so that other operations would not be delayed. It was estimated that, if existing equipment was used to bore the 30-ton frame casting of each of the machines, 60 hours would be required to perform one boring operation. Since each casting required three complete boring operations, the length of time needed for this process was expected to interfere with the operation of the production line. In order to reduce the time required, two courses of action were possible: either to add additional standard boring equipment, such as a horizontal milling machine or a vertical boring mill, or to obtain a special machine tool for the operation. It was estimated that if the latter course of action was adopted the entire operation could be performed in 22 hours. The tool would be so highly specialized, however, that it could not be used for any other operation unless a substantial sum was spent to rebuild it.

If additional standard boring equipment was purchased, the cost would be $30,000 for a large-size horizontal milling machine or a large-size vertical boring mill, and delivery could be obtained in about three months. These machines required large amounts of floor space but could be used on several classes of heavy work. If a special machine tool was purchased, the cost would be approximately $100,000, and delivery could be obtained in from five to six months. The tool would be large but would save floor space. It was estimated that savings permitted by the special machine tool would approximately pay for the tool. There was, moreover, the consideration that the special tool would probably produce work of a higher quality. This consideration was of vital importance as the company followed a policy of manufacturing only products of the highest quality.

If serious consideration was given to the purchase of the special machine tool, the procedure would be as follows: The mechanical engineering department would make preliminary plans and specifications showing the dimensions and various parts and giving an estimate of the mechanical strength required to perform the work. After a careful check to determine that the machine was practical, the plans and specifications would be given to the director of equipment negotiations. From his knowledge of the various machine tool builders he would know which ones would be capable of making the special tool. In the case of the special tool under consideration there were only four builders in the United States which were capable of making equipment of the required type and size.

The director of equipment negotiations would then submit plans and specifications of the tool as well as drawings of the 30-ton frame casting to the builders and ask for estimates as to the type of machine they would suggest, the cost, and the time of delivery. Each bidder would probably send an engineer to the company to discuss the proposed machine tool with the company's engineers and production executives. After a study of the problem the machine tool builders would submit outline drawings of the machines they proposed to furnish and price quotations.

When the director of equipment negotiations received the outline drawings and quotations, he would call a meeting of the members of the plant manufacturing equipment department, the superintendent of the department in which the tool was to be used, the machine tool supervisor for that department, the plant manager, and, in important cases, the general works manager. The proposals submitted by the four machine tool builders would be studied carefully, criticized, and finally compared item by item, consideration being given to the size of the parts, the list of parts, the total weights, the costs, the delivery date, and the estimated production ability of each machine. If necessary, representatives of the machine tool builders would be asked to attend the meetings to answer questions concerning their proposals.

After a careful comparison a final selection would be made in which the three foremost factors considered would be time of delivery, design, and productivity. The successful bidder would be informed of the selection, and the suggestions resulting from the conferences would be passed along to be incorporated into the final designs of the machine which the builder would prepare and submit to the company for approval. Another general meeting would be held for the purpose of approving the final drawings. Even though the company approved the final drawings, the machine tool builder would be held responsible for any weakness in design. It had been the company's experience that weaknesses not apparent in a design sometimes appeared when the machine was being built. The builder was expected to discover any such weaknesses and make the necessary corrections. The director of equipment negotiations would follow the program of the building of the machine to insure that delivery would be made on the date specified.

62. CRANDALL MOTORS COMPANY

SELECTION OF SUPPLIER

In the spring of 1932 the Crandall Motors Company required a new rustless steel condenser unit for use in the manufacture of some of its products. After the bids had been received and examined, the engineering department recommended the acceptance of the highest bid, while the purchasing and the using departments favored the acceptance of the lowest bid.

The Crandall Motors Company, located in Detroit, Michigan, was a large and successful manufacturer of motorcars, trucks, and a diversified line of industrial and consumer products. It was composed of 10 units, many of which were subsidiary companies acquired through merger and each of which manufactured a related group of the company's products. The management of each unit was held strictly responsible for the success of the unit, subject, however, to general policies determined by the central management, which provided also for cooperation between units.

The organization within units was based essentially on the same principles of management which governed the entire company. Each department head was responsible for the efficient operation of his department and was expected to use the authority necessary to obtain efficiency. In instances where the authority of departments conflicted, the department heads were expected to adjust the differences through conferences. In cases where the department heads were unable to reach a settlement, the controversy was referred to the local executive committee for a decision. A spirit of cooperation prevailed, and the executives took pride in being able to settle conflicts in authority among themselves.

This policy was well illustrated in the operations of the purchasing department. The parent company maintained a purchasing department which bought approximately 90% of the $75,000,000 worth of materials, supplies, and equipment required annually in the operation of the various units of the company. The department was in charge of a director of purchases who reported directly to the president and to the executive committee of the parent company. This department had the right to question any using department which requested an item considered by the purchasing department inferior to other items intended for a similar purpose, giving due consideration to quality, service, and price. If the using department refused to consider the recommendations of the purchasing department and insisted on items which the purchasing department believed to be opposed to the best interests of the company, the executives of the purchasing department could appeal to the executive committee for a decision as to which of the recommendations should be followed. The purchasing department realized that, since the executives of the using department had to use the item and were held responsible for the results obtained, they were entitled to a major part in any decision concerning the selection of an item. The purchasing department believed, moreover, that the executives of the engineering department who were in charge of the compilation of specifications should have the opportunity of expressing their views with regard to the selection of items and, in some instances, the source of supply. However, the purchasing department was convinced that, if quality and service were equal, it should patronize the source of supply which quoted the lowest prices.

In April, 1932, the superintendent of the company's Philadelphia plant requested a new rustless steel condenser unit for use in his plant. The condenser required was not a standard type of industrial equipment and therefore would have to be specially constructed. The engineering department studied the requirements for which the condenser was to be used and then compiled specifications and drawings which were given to the purchasing department. The buyer, a graduate engineer, in charge of procuring the group of technical equipment under which condensers were included, sent a request for bids to four suppliers which had facilities for making the type of condenser called for under the terms of the specifications. The four suppliers were selected on the basis of responsibility, technical skill, and a reputation for excellence of quality.

Bids were received from three of the suppliers, as follows:

1. Starr Engineering Company, Chicago, Illinois: $2,060, f.o.b. plant.
2. Brown Iron Works, New York City: $1,810, f.o.b. plant.
3. Willund Company, Baltimore, Maryland: $1,220, f.o.b. plant.

The buyer believed that each of the suppliers submitting a bid could furnish a condenser which would meet the specifications. The Starr Engineering Company was regarded nationally as being the best builder of special technical equipment in the United States; the excellence of the company's engineering ability was unquestioned. The Brown Iron Works had constructed satisfactory equipment for the Crandall Motors Company in the past. The Willund Company had had extensive experience in catering to the needs of the Crandall Motors Company and had always been a highly satisfactory source of supply, furnishing equipment of high quality promptly and at reasonable prices.

The buyer recommended that the contract be awarded to the lowest bidder. The superintendent of the Philadelphia plant concurred in the recommendation, but the engineering department believed that the highest bidder should receive the award. The executives of the engineering department advanced the argument that specifications for the condenser required the use of special materials which had not been used commonly, and that consequently there might be some trouble in building the condenser. The opinion was expressed that the engineers of the Starr Engineering Company would probably be able to meet any special problem which might arise with greater technical skill than could the engineers of the other two companies. The buyer believed that the engineers of the Willund Company were equipped to construct the condenser in accordance with specifications.

63. NORTHERN MOTORS CORPORATION (B)

PURCHASE OF SPECIAL EQUIPMENT

The Northern Motors Corporation, a leading manufacturer of internal combustion engines, made large annual purchases of special machinery. These purchases had been made jointly by the engineering department and the works manager. In 1930, for the purpose of insuring maximum economy and efficiency, this function was made a duty of the purchasing department.

The Northern Motors Corporation manufactured a full line of automobile, industrial, aircraft, and marine engines, the combined output of which averaged more than 1,200 motors per day. Production took place in two plants, in Dayton and Cleveland, Ohio. The home offices of the company, including those of the general purchasing officer, the chief engineer, and the works manager, were located in the Cleveland plant.

During the company's early history all machinery had been purchased by the president. Following a period of rapid expansion, this duty was delegated to the engineer and the works manager. These officers, because of their close contact with the mechanical aspects of production, were believed to be best qualified to buy all machinery and in particular the so-called "special" machinery. The latter included such items as were peculiar to the production process of the Northern Motors Corporation, or not "commonly accepted" as standard.

Purchases made under this form of organization had not been subject to competitive bidding. The engineer and the works manager had determined all requirements, selected one source, and awarded the contract without further consideration. There were several reasons for following such a procedure. Both the works manager and the engineer were occupied almost entirely with production duties. Furthermore, they did not have the facilities to enable them to secure additional sources of supply, nor were they in the most favorable position to obtain a bird's-eye view of market conditions or to investigate products which might serve as possible substitutes.

The company could not object to a noncompetitive purchasing plan in cases involving monopoly-controlled products fully covered by patents. Such control, however, was seldom held over standard equipment and not very often over special machinery. Furthermore, even though only one vendor was available, the purchasing officer or one of his buyers was believed to be in a much better position to make price arrangements, for instance, than was either of the two production officers. Because of this belief and a desire for all possible economy, the purchase of machinery was made a duty of the general purchasing officer.

The purchase of standard machinery, under the new policy, was a matter of routine. The purchase of special machinery, however, constituted a more complicated process. To overcome the inherent objections of the production department to any plan which prevented it from dictating the source of purchase for equipment with which it alone was thoroughly familiar, the general purchasing officer devised a procedure by which the two production officials would act in an advisory capacity. Before any commitments were made, the works manager and the engineer were to submit the names of three different brands or types of special equipment which could be used on the job to be undertaken. They were also asked to designate which of these brands they preferred. The general purchasing officer then obtained price quotations from all three manufacturers. If the price of the preferred equipment was not very far out of line with that of either of the other two brands, that equipment usually was selected. On the other hand, if the price of the preferred equipment was unreasonable, the purchasing officer selected one of the other two brands. His authority was final, regardless of all other considerations.

During 1929 the Northern Motors Corporation's machinery purchases had approximated $650,000. Under the new purchasing plan the company estimated that a saving of at least $32,500, or 5% of the amount expended, would have been made.

64. MURDON COMPANY

DISPOSITION OF REPLACED EQUIPMENT

Before 1930 the Murdon Company had shown an operating profit for each of the 50 years since its establishment. The severe competition in both quality and price encountered in 1930 and subsequent years, however, led the company in 1934 to consider equipping its plant with new and more efficient machinery. One of the factors involved in arriving at a decision as to whether to install new machinery was that of the disposition of old equipment, some of which was salable as secondhand equipment.

The Murdon Company's products were known in the industry as warp yarns, which were used in the manufacture of textile materials. Warp yarns were threads running lengthwise of a cloth and holding in place the filling yarns, or crosswise threads of the cloth. The company's sales of yarns normally varied from 3,000,000 to 4,000,000 pounds a year. The annual dollar volume of sales amounted to between $1,000,000 and $2,000,000, varying with the price of cotton as well as with the physical volume. The company's customers were for the most part either manufacturers of worsteds, woolens, and textile materials other than cotton who used cotton warp yarns in their production; or small manufacturers of cotton cloth who purchased rather than manufactured their own yarns.

The quality of warp yarns was of utmost importance to cloth manufacturers. Lack of uniformity in the thickness of the yarn, caused by bulky knots or small snarls in the fibers, resulted in rough cloth which in turn occasionally caused temporary stoppages of looms. The strength of warp yarn was another important quality factor, since breaks in the yarn necessitated temporary shutdowns of the weaving looms while the breaks were being repaired. Frequent stoppages or shutdowns eliminated any cost advantage prevailing between yarns of different qualities. The Murdon Company used the more expensive long staple grades of cotton in manufacturing its warp yarns, and the resulting high quality of its product had enabled the company to command a considerable price advantage over the majority of competitive yarns. From the time of the organization of the company in 1880 until 1930, operations had consistently shown a profit, and the company had become financially strong as well as firmly entrenched in its field of business.

Severely depressed business conditions in the textile industry in 1930, however, caused the company to operate at a loss of nearly 15% on the company's capital investment of $1,500,000. In that year the company's volume of physical sales totaled less than 2,000,000 pounds, as compared with 4,000,000 pounds in 1929. This drop in volume was the result of a sharp curtailment in the volume of production by the larger mills served by the company and either a reduction in the volume of operation or complete liquidation of its smaller mill customers, and of severe competition for the remaining business.

After 1930 there was competition in price as well as in quality. Whereas before that time the company's competition had been from small warp yarn mills, which because of less investment in production equipment and therefore not so great overhead costs had been able to compete on a price basis, after that time some of the company's competition came from larger mills that had previously produced yarn only for their own consumption. New technical developments made in the late 1920's had resulted in improved spinning equipment, which produced yarns of better uniformity and greater strength. Manufacturers who used this type of equipment were able to produce high test yarns from the cheaper grades of cotton and at the same time to realize a saving in the processing cost of the yarn. Several of the large textile mills that had not previously been of importance in the warp yarn market were using this improved spinning equipment, and with the slackening of their own business were selling warp yarns in an effort to utilize idle capacity. Since the sale of warp yarn was supplementary to the primary business of these concerns, it was not always necessary for them to charge prices which covered their entire costs of producing yarns.

In 1930 the management of the Murdon Company was, for several reasons, somewhat hesitant about investing in new and more modern equipment. In the first place, depreciation on the company's old equipment had not been entirely written off on its books. Second, the general feeling was that conditions at that time were temporary and that ultimately competition would return to its former level. Third, there was some question as to whether machinery then available would not soon become obsolete.

Immediate action concerning the replacement of machinery was temporarily postponed when, early in 1931, the company turned to the production of novelty yarns. The market for these yarns apparently was just beginning to develop. Novelty yarns could be produced satisfactorily with the equipment then owned by the Murdon Company; they were a comparatively new line, and the company was one of the first to exploit them. The profit to the company on such yarns was wholly satisfactory. During the year 1931 approximately one-half of the Murdon Company's total sales of 2,300,000 pounds were of novelty yarns. The profit on this business practically offset the losses incurred on the regular warp yarn business. During the year 1932, novelty yarns were still the company's most profitable line although the market had become more competitive. Warp yarns continued to sell at a price below the Murdon Company's cost of production.

In late 1932 and early 1933 the Murdon executives were still facing the question of plant efficiency, but final decision was once more postponed because of the pronounced boom in the textile industry after the National Industrial Recovery Act and the Agricultural Adjustment Act became effective. Demand for yarns expanded substantially in anticipation of both higher manufacturing costs resulting from the NIRA and the proposed processing tax on cotton. This demand resulted in an increase in prices of warp yarns well over the company's cost of production and permitted it to make its normal margin of profit on capacity production.

By the end of 1934 the company was again forced to sell at a loss all its warp yarns, which were expected to comprise 75% of the company's sales in the future. Novelty yarns, representing the remaining 25% of the company's business, were still salable at a profit, but the margin was reduced to a point that hardly compensated for the style risk involved. In July, 1934, the Murdon Company's production and selling cost for No. 20/1 warp yarn, which was representative of all grades of the company's warp yarns, was 37.24 cents a pound, 13.22 cents of which represented manufacturing cost. The range of price for this grade of yarn in the market was from 32 cents to 36 cents a pound. The highest price which the Murdon Company could reasonably expect to charge for its product was that represented by the upper limit of the competitive range of prices.

The executives of the Murdon Company believed that a substantial part of the low price competition prevailing in 1934 was from mills on the verge of bankruptcy which were going into debt to the Federal Government to the extent of the processing tax on the cotton they used. It was believed that in order to keep their mills in operation these manufacturers were ignoring the processing tax on the grounds that they were already bankrupt and that they therefore had nothing to lose by becoming indebted to the government to the extent of the tax. This procedure gave these manufacturers an advantage of between 4 cents and 5 cents a pound in the production cost of their yarns.

Despite the uncertainties in the industry resulting from governmental policies, the Murdon Company late in 1934 requested a representative of a textile machinery manufacturer to make a survey of the Murdon plant for the purpose of determining what new equipment would have to be purchased to bring the company's production facilities up to maximum efficiency. His survey indicated that approximately $120,000 would be required to re-equip the plant with modern machinery capable of producing an output equal to the plant's capacity at that time. This amount of new equipment would necessitate the retirement of equipment carried on the company's books at $18,500. According to the machinery manufacturer, the new equipment would produce a higher test yarn at a manufacturing cost (including depreciation and carrying charges on the new equipment) 1½ cents per pound below the company's current cost. He pointed out that the company could either take advantage of the higher quality of the new product in its sales promotional efforts, or could manufacture from cheaper raw materials yarn of equal quality to that then being produced.

On the basis of experimental results obtained on trial equipment installed in the company's plant, the Murdon executives were convinced that the 1½ cents a pound saving in the manufacturing cost and the improved quality in yarn could be effected. Uncertainties in the future outlook for their business, however, made them doubt the wisdom of investing $120,000 in new equipment at that time. They, therefore, undertook a survey of the plant to determine whether a part of the old equipment could be economically replaced with new. This survey indicated that an investment of approximately $70,000 would convert about one-half of the plant's capacity to the new-style equipment.

The effect of the new equipment on the cost of production for No. 20/1 yarn would be to reduce the manufacturing cost from 13.22 cents to 11.88 cents, a saving of 1.34 cents a pound of yarn.

The disposition of the old equipment involved a problem for the management of the Murdon Company. There were 3 finishing pickers and 48 drawing frames which were carried on the books at $978 and which, although salable as secondhand equipment, were worth little more than their scrap value. On the other hand, 28 roving frames, which were being carried on the books at $4,449 and which had a scrap value of less than $1,500, could be sold as secondhand equipment for approximately $8,000. Since at least one of the companies that were competing for sales of warp yarns on a price basis was able to do so because it had obtained its equipment through the purchase of a bankrupt mill, however, the executives of the Murdon Company felt a definite responsibility in allowing the used machinery to enter the market.

The availability of such machinery at sacrifice prices or at near scrap prices, even if it was partially obsolete, represented a distinct hazard to the textile industry. Not only could machinery which had been acquired at low cost be operated with a minimum of overhead expense, but the opportunity for entering the industry with little capital tended to encourage the least desirable type of competitor, that is, one quite willing to resort to unfair trade practices, abuse of labor, unbridled price competition, and similar policies. Within the textile industry this problem particularly affected manufacturers of yarns, since much less machinery was required for the production of yarns than for the production of cloth. Furthermore, a large part of the Murdon Company's market was composed of small manufacturers of cloth, who were more inclined to accept yarns that were produced cheaply through undesirable methods than the larger and more progressive concerns.

The problem of disposing of replaced equipment was also of interest to machinery manufacturers.[1] In the absence of any effective action by the manufacturers of textile machinery, however, the Murdon Company executives were inclined to believe that the individual concern replacing its used equipment should be responsible for insuring that such equipment did not enter the market and thereby aggravate the difficulties already existing in the textile industry.

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[1] Hartley W. Barclay, editor of *Mill & Factory*, proposed four possible methods of contending with this problem:

1. Develop cooperative plans for machinery *manufacturers* to find new methods of disposing of their own obsolete products.
2. Develop cooperative plans for machinery *users* to find new methods of disposing of their own obsolete equipment.

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3. Develop plans to tax capital goods obsolescence so that it would be prohibitive in cost to own industrial equipment and machinery longer than a reasonable predetermined life period.

4. Apply a compensating tax to machine hours so that a national fund could be established with which to buy obsolete equipment for the purpose of scrapping it so as to protect price levels in capital goods markets.

(See "Crackdown on the Real Chiseller!", *Mill & Factory*, December, 1933, p. 5.)

SECTION VIII

PRICE POLICIES

65. SHEPARD UNIVERSITY (B)

HANDLING BIDS ON INSTALLATIONS

Late in the spring of 1931 the construction of five new dormitories at Shepard University had progressed sufficiently for the kitchen equipment to be installed in the buildings. This equipment included such items as steam tables, ovens, dishwashers, glass-washing counters, and coffee urns.

The requirements for kitchen equipment varied widely among the five buildings, depending on the rooming capacity of the individual buildings and on their location with respect to other buildings. For instance, the dining room of one new building could be served by the kitchen of an adjacent building, and therefore the new building required only auxiliary equipment, such as dishwashers and china cabinets. Because of this lack of uniformity of requirements for the new buildings, there was little standardization in the equipment to be installed, and the purchasing officer of the university saw no advantage in placing one contract to cover the installations in the five buildings. On the contrary, to place five separate contracts, all of which probably would not be awarded to any one contractor, would speed the work and would enable a larger number of contractors to bid for each contract at a reasonable price. The purchasing officer believed that several of the contractors in the vicinity of the university were not equipped to undertake the five jobs at the same time at a cost comparable with that for larger contractors.

The preparation of the specifications for the kitchen equipment had been turned over to the firm of architects which had designed the buildings, the specifications to be subject to the approval of the university purchasing officer and the committee in charge of the construction. In payment for their work, including the preparation of these specifications for equipment, the architects were to receive 5% of the total cost of construction.

At the time of the original planning of the new buildings, the architects had made a rough estimate of the cost of the kitchen equipment but had submitted no detailed list of the items required.

In May, 1931, the purchasing officer of the university received detailed specifications for equipment for the first of the buildings to be ready for the installations. The specifications submitted by the architects had been prepared by one of the contractors from whom the purchasing officer planned to request a bid on this equipment. The specifications were thorough in their descriptions and included no details which could be supplied only by this one contractor.

The purchasing officer had on hand several manufacturers' catalogues containing price lists of practically all the items listed in the specifications. From these catalogues he was able to make a reasonably accurate estimate of the cost of the various items, exclusive of the labor cost incurred in connection with their installation. After estimating what he considered a reasonable amount for labor charges and a fair margin of profit to the contractor, he anticipated a total cost of $15,000 for this equipment installed. With but few minor changes the specifications were accepted as satisfactory by the purchasing officer and by the university committee in charge of the construction. A copy of the specifications, together with a request for bids on the installation of the items listed, was sent to each of seven contractors, including the one who had drawn up the specifications.

The bids which were returned quoted prices varying from $17,000 to $20,500. The purchasing officer was unable to reconcile these prices with his own estimate on the basis of any possible errors in his own calculations. He believed, therefore, that each contractor had set his price so as to allow an extra margin of profit, expecting to be allowed to revise that price if his bid proved to be too high and still to have a margin of profit. The purchasing officer decided not to accept any bid immediately. Within a week following the receipt of the bids, representatives of each of the contractors came to the purchasing officer in an attempt to find out the exact relation of their respective bids to the others. The purchasing officer answered them only by telling the representative of the contractor who submitted the lowest bid that it was the lowest received up to that time, and by telling each of the others that his was not the lowest.

Upon receiving this information, each contractor whose bid was high requested permission to submit a new bid, intimating that he would reduce his price. In two instances the proposed reduction was as great as 20% of the original quotation. The contractor whose bid had originally been lowest learned through outside contacts that other contractors were quoting new prices which were lower than his original price; whereupon he asked for permission to quote a new figure on his bid. In all instances the contractors requested the opportunity of placing lower bids for the entire job, without attempting to discover in just what parts of the specifications their respective bids might have been too high.

The fact that each contractor had thus attempted to lower his original bid was, the purchasing officer considered, a reasonable confirmation of his belief that each had originally sought too large a profit margin with the expectation that he could still cut his price and receive the contract if others underbid him. The purchasing officer believed that if he allowed the contractors to juggle figures on this first contract, he must expect a similar bargaining procedure on each of the transactions which were contemplated in the near future. He therefore declared void all bids on these first specifications for equipment and sent out requests for new bids which were to be final unless for some particular reason the purchasing officer suggested changes.

The bids which were returned in response to the second request were more nearly uniform than those submitted upon the first request, approximating the price which the purchasing officer had expected to pay. The range between the lowest and the highest of these quotations was $1,500. For each of the bids the purchasing officer compared the prices of the separate items in the list to ascertain, if possible, the causes for the variations in the total contract prices. He found several instances in which some one contractor had quoted a price for a particular item widely different from the prices quoted by the others for that same item. In such instances, believing that the variation was evidence of a misunderstanding of the specification for that item, the purchasing officer explained the specification to that contractor whose price was out of line. If he found that there had been a misunderstanding of the requirement, he gave the contractor the privilege of changing his price on that item, whether the price was too low or too high. Two of the contractors found it advisable to lower their prices on one item each, while one contractor following the explanation raised his price on one item, the specification for which he had misunderstood.

After allowing such changes to be made, the purchasing officer accepted the lowest bid of $14,200, this price to include the installation of the equipment. It happened that the contractor who had prepared the specifications for this equipment was not the recipient of the contract. He immediately appealed to the purchasing officer for a payment of $150 for the service which he had performed. The purchasing officer informed him that payment for this service was included in the fee to be paid to the firm of architects and that he would have to appeal to them for settlement. The purchasing officer had attempted not to favor the contractor preparing the specifications, although he had realized that the quality of the equipment desired was best known by this contractor.

66. EASTERN LIGHT & POWER COMPANY

ANALYSIS OF BIDS

In negotiating for its 1930 cable requirements, the Eastern Light & Power Company received bids from six vendors. The lowest quotations were submitted by the Lockport Steel Wire Corporation, one of the suppliers for 1929. On the basis of that company's 1929 contract, however, the purchasing officer believed that the current bid from the Lockport Steel Wire Corporation was excessive. He therefore considered the advisability of asking for new quotations.

The Eastern Light & Power Company followed the policy of investigating sources of supply to determine the ability of the supplier to furnish the required quality and quantity. Whenever it was possible, the company purchased from two sources so as to insure continuous supply in case one of the suppliers should be unable to fulfill his contract. The company believed that, as a public utility upon which people relied for continued service, its duty was to take every reasonable precaution to insure uninterrupted service.

Because of this policy, cable and cable suppliers were subjected to a very strict investigation. Reports concerning the financial stability of and the economic factors affecting a supplier were drawn up by the purchase record and research division of the purchasing department. Inspection of the plants, equipment, and process of manufacture of all established and potential suppliers was carried on by the inspection division of the purchasing department. Inspectors from this division who were specialists in cable manufacture inspected all cable during manufacture and upon completion made tests to determine copper and insulation resistance, dielectric power loss, bending properties, physical measurements, and voltage properties. Tests, however, could not insure perfect cable, and thus the reputation of the manufacturer was an important consideration. Whenever cable, whether put underground or strung overhead, proved defective in use, the interruption of service was serious and the expense of replacement great. For this reason cable was never purchased on a strictly price basis.

Prior to 1929 the company had purchased cable from the Vulcan Cable Corporation, one of the largest cable manufacturers, and the Probeck Wire & Cable Company, a small producer. Following a thorough investigation the purchasing department was convinced of the superior processing facilities and knowledge of the product possessed by the Lockport Steel Wire Corporation. It was only after much difficulty, however, that the engineering department was persuaded to make a similar study and thereby pass on the company as an approved source of supply.

Only about 20% of the company's 1929 cable requirements were awarded to the Lockport Steel Wire Corporation, even though it was the lowest bidder. The remaining 80% were awarded to the Vulcan Cable Corporation, whose price was $75 higher per thousand feet. The Vulcan product had proved satisfactory in the past, and it was in accord with the company's policy to rely primarily on products with an established reputation.

During 1929 the Eastern Light & Power Company, together with other users of cable, found that Vulcan cable did not meet past standards of quality. In some instances the company had to replace sections of cable that had been installed. The fact that there was trouble with the Vulcan cable was common knowledge in the industry. On the other hand, the cable furnished by the Lockport Steel Wire Corporation proved very satisfactory and was developing a splendid reputation for that company.

In December, 1929, the purchasing officer for the Eastern Light & Power Company asked for bids on his company's cable requirements for the year 1930. It was planned to divide the requirements into two orders: one for 300,000 feet and the other for 400,000 feet. The purchasing officer had found from past experience that when the quantity ordered was above 25,000 feet it ceased to have a bearing on price. If too large an order was placed with one supplier, the extra load on the supplier's plant might result in delayed deliveries.

Bids were submitted by six suppliers and ranged from $1,470 to $1,550 per thousand feet of cable. The lowest bidder was the Lockport Steel Wire Corporation, whose product had the highest reputation. The Vulcan Cable Corporation was next in line with a bid of $1,480. After receiving the bids, the purchasing officer made his usual cost analysis in order to determine whether the bids were consistent with past prices. He did this by subtracting the known costs from the bids and comparing the results with those of the previous year, thus obtaining a differential.

When the analysis was made of the bids submitted by the Lockport Steel Wire Corporation, the following facts were obtained: In 1929, when the price of the cable was $1,500 per thousand feet, the cost of copper and lead was $580 per thousand feet, these two items comprising the primary material cost. At the time prices were received for the 1930 requirements, the cost of copper and lead had declined to $480 per thousand feet. Since the costs of the paper and impregnated oils used in making the cable were not known, they were not included in the computation, the policy of the buyer being to use only known costs. It was readily determined, however, that paper and oil prices had not increased during the year under consideration. The purchasing officer knew roughly the selling costs, manufacturing costs, overhead, and profit through his contacts with the salesmen and executives of vendor companies.

The company made its first purchase from the Lockport Steel Wire Corporation in 1929. At that time the executives of this corporation, in conversation with the buyer and the purchasing officer of the Eastern Light & Power Company, had given rough estimates of the corporation's costs and mentioned that their company was making satisfactory profits on cable at a price of $1,500 per thousand feet.

As a result of the cost analysis the purchasing officer believed that, even though the Lockport Steel Wire Corporation was the lowest bidder and furnished the best quality cable, its prices were not justified. He considered that a fair price would be approximately $1,400 per thousand feet of cable. A similar cost analysis made of the Vulcan Cable Corporation's bid showed that its prices had been reduced in proportion to the decrease in material prices. This company was making every effort to remedy the defects which had resulted in the production of poor cable in 1929, and it was reasonable to expect that during 1930 its product would be equal in quality to the former standards.

The purchasing department of the Eastern Light & Power Company followed a policy of never haggling with a vendor about prices. The purchasing officer believed that if a company obtained a reputation for price haggling, vendors usually submitted higher quotations in expectation of being forced to reduce the price to meet the buyer's demands.

67. AUTOMATIC REFRIGERATOR COMPANY

UNWARRANTED PRICE REDUCTION

For six years prior to 1931 the Automatic Refrigerator Company had purchased from the Matthews Corporation small thermometers for use in its product, a high-quality electric refrigerator. The thermometers were not included as parts of the assembly of the refrigerators but were distributed to the sales and service representatives of the company, who sold them at $1.25 each to customers requesting them at the time of purchasing refrigerators. The thermometers had no connection with the automatic operation of the refrigerators.

In 1925 the purchasing officer of the Automatic Refrigerator Company had selected the Matthews thermometers largely on the basis of their quality, which he believed to be superior to that of similar thermometers produced by other manufacturers. The thermometers purchased from the Matthews Corporation were of a standard type, except that the name "Aurefco" was etched on each unit shipped to the Automatic Refrigerator Company. Since an attempt to inspect each thermometer received from the manufacturer would involve an expense which would be high in relation to the unit price, the Automatic Refrigerator Company had to rely in large part upon the reputation of the manufacturer for uniform quality of product.

As far as could be determined by the company, the quality of the thermometers supplied by the Matthews Corporation had been satisfactory. They were used by customers scattered throughout the United States and foreign countries, and consequently no definite check on their performance was possible. The customers, themselves, had little means of judging the accuracy of the thermometers. The company had received very few complaints, however, and the purchasing officer had received no requests to change his source of supply. Salesmen representing other companies manufacturing similar units had been interviewed in the meantime, but the purchasing officer believed that the product of the Matthews Corporation was as yet superior to that of its competitors. During 1930 the company purchased approximately 35,000 thermometers, ordering them at intervals of three or four months, at a price of about 90 cents each.

In 1930 the Mardell Company was organized to specialize in the production of a varied line of thermometers. In April, 1931, a salesman of the Mardell Company called upon the purchasing officer of the Automatic Refrigerator Company to present one line of thermometers which were suitable for use in household refrigerators. Because the company was trying to reduce expenses wherever possible, the purchasing officer was immediately interested in the price quoted, which was 70 cents each for a product which appeared equal in quality to the thermometers supplied by the Matthews Corporation. He did not place an order at that time, however, but agreed to test the thermometers of both companies and to compare the results.

It so happened that when the salesman from the Mardell Company left the purchasing officer the next caller was the salesman from the Matthews Corporation, who had regularly called for orders in the past. This salesman while waiting in the outer office had learned that the purchasing officer was talking to a representative of the new Mardell Company, which was recognized in the industry as a low-cost producer despite its comparatively short existence. When the salesman from the Matthews Corporation entered the office, he stated that he knew that the price he had to offer for thermometers would be too high at that time, and that he would like to have one hour in which to call his home office, from which he hoped to receive authorization to quote a lower price. After making the telephone call, he returned and quoted a price of 60 cents each for an order not to exceed 10,000 thermometers.

The purchasing officer believed that this 33⅓% price reduction could not be explained entirely by savings which the Matthews Corporation might have realized in production and selling costs during the three months since the last order had been placed. After his conversation with the representative of the Mardell Company, he believed that the Matthews Corporation had held its price at 90 cents longer than was justified by the quality of its product. At the same time he was convinced that the new price of 60 cents was below total cost to the Matthews Corporation and that it was quoted largely as a combative measure against the new competition from the Mardell Company.

Aside from any consideration of the quality and price of the thermometers which he had bought in the past, the purchasing officer of the Automatic Refrigerator Company had not been entirely satisfied with his relations with the Matthews Corporation. At one time in 1929 an emergency arose requiring an additional supply of 250 thermometers within four days, as a new retail sales office was to be opened two weeks in advance of the date planned for its opening. The day that the representative from the purchasing department of the company visited the Matthews Corporation, hoping to arrange for a rush order to meet this emergency, happened to be the day on which the fishing season opened. Practically a full day was consumed before the Matthews Corporation accepted the rush order, and the shipment was a day late in arriving. It was the opinion of this representative that the executives of the Matthews Corporation were more concerned with outside interests than with the matter of furnishing satisfactory service to a steady customer.

In several other instances promises which the purchasing officer of the Automatic Refrigerator Company had received from the Matthews salesman who regularly solicited its business had been overruled by the central office of the Matthews Corporation. The purchasing officer believed that the Matthews Corporation, in sending a salesman with authority to make decisions, should support that salesman unless his decisions were consistently disadvantageous to his company and that, if his decisions were often in error, the Matthews Corporation should have replaced him with another salesman.

The Mardell Company was already doing a large business in thermometers for other specialized uses as well as for use in refrigerators. Its reputation to date was highly satisfactory, and since the demand of the Automatic Refrigerator Company was for a standard item there was little danger of a misunderstanding concerning the product desired. The purchasing officer of the Automatic Refrigerator Company shared the general opinion that, because of its new specialized machinery and production methods, the Mardell Company had the lowest costs of any producer in its line of business; and he believed it very probable that the Mardell Company was entirely justified in quoting its price of 70 cents each for thermometers of the desired type. He was convinced, furthermore, that the price was not low merely for the purpose of an entering wedge into additional fields and that there was little danger that this price would be raised in the near future unless prices rose generally throughout the industry.

68. HOPKINTON METER COMPANY

PURCHASE OF PARTS AT PRICE BELOW COST

The Hopkinton Meter Company manufactured metering devices for use on such equipment as packaging and wrapping machines. A metering device measured the flow of granular or liquid materials through a machine. When meters were sold to builders of a certain type of packaging equipment, it was necessary for the company to include a small stud with which to connect the counter unit to the operating mechanism of the machine. The Hopkinton company obtained its requirements of studs from the Harberry Screw Machine Products Company, a small near-by concern. Late in 1937, however, the Mixton Company offered to furnish these parts at a price 50% below the price being paid to the Harberry company. Since the latter concern indicated that it was unwilling to lower its price, the purchasing officer of the Hopkinton Meter Company was considering whether he should accept the offer of the Mixton Company.

The Hopkinton company sold a certain type of meter to four or five packaging machine builders. Each machine manufactured by these customers required one meter and the necessary connecting stud. Although the annual consumption of any one of these concerns might vary from year to year, as a group they purchased between 40,000 and 50,000 meters a year. The Hopkinton company charged $35 for each meter and furnished the connecting studs at a unit price of 5 cents.

The studs were approximately 2½ inches in length and were cut from ¼-inch cold-rolled steel shafting. It was impossible for the meters to operate properly unless the studs were accurately machined. For this reason the Hopkinton Meter Company had manufactured the studs on its own screw machines originally. In 1931, however, the company investigated the possibility of purchasing the studs from outside sources. The capacity of its screw machines was limited, and in addition the company believed that a concern which specialized in the production of screw machine products might supply the studs at a price lower than its own production cost, which amounted to about 4¼ cents a unit. Eight reputable screw machine companies submitted quotations, of which the bid of 4 cents a unit received from the Harberry Screw Machine Products Company was the lowest.

During the following six years the Harberry company sold the studs to the Hopkinton Meter Company in lots of 25,000 units, at the quoted price of 4 cents a unit, f.o.b. the latter's plant. The 1-cent gross profit which was thereby available to the Hopkinton company covered the handling and packing expense that was incurred in shipping the studs to the packaging machine manufacturers. The company estimated that packing and handling costs amounted to from ¾ cent to 1 cent a unit. The Hopkinton company's total annual consumption of studs during this period ranged from a low of 20,000 to a 1937 high of 50,000.

During the six-year period the Harberry Screw Machine Products Company had been a very satisfactory supplier. In quality and workmanship the studs furnished by this supplier were fully as satisfactory as those formerly manufactured by the Hopkinton Meter Company. In addition to the studs, the Hopkinton company purchased other parts so that, by 1937, its annual purchases from the Harberry company exceeded $50,000. The total annual sales of this company were believed to approximate $250,000.

Late in 1937 the sales manager of the Mixton Company approached the purchasing officer of the Hopkinton Meter Company with an offer to furnish studs at a price of 2 cents a unit in lots of 25,000, f.o.b. the buyer's plant. The Mixton Company was unknown to the purchasing department of the Hopkinton company, but investigation by the purchasing officer revealed it to be a screw machine company approximately twice as large as the Harberry Screw Machine Products Company. A well-known credit-rating agency reported that the financial and credit standing of the potential supplier was satisfactory. Although the sales manager of the Mixton Company stated that 25% of his company's sales were to the automobile industry, the purchasing officer had some reason to believe that approximately 75% of the Mixton Company's sales were to the three largest automobile companies in the country.

At about the same time, the sales manager of the Hopkinton Meter Company informed the purchasing officer that two of its packaging machine customers had been approached by the Mixton Company with offers to sell them the studs directly, in lots of 1,000, at a net delivered price of 4 cents a unit, which was 1 cent below the price being charged by the Hopkinton company. One of these packaging machine companies had already placed a small order with the Mixton Company. The sales manager of the Hopkinton company felt that this condition should be remedied as he wished to avoid reducing the dependence of these important customers upon the Hopkinton Meter Company.

The normal quantity of studs purchased by the Hopkinton company at any one time was 25,000 units, or approximately a six months' to eight months' supply. There were two reasons for carrying this large stock. (1) On lots of 25,000 units the Harberry Screw Machine Products Company was able to quote a price from 2 cents to 4 cents under that charged for small lots of 1,000 units, which was the usual size of shipment made to the packaging machine companies. (2) As a rule, the packaging machine manufacturers placed annual contracts for meters and studs at the beginning of each year, shipments against these contracts to be made immediately when called for and in lots of not less than 500 units. Since most of the packaging machine companies bought at approximately the same time and the peak period was not usually predictable far in advance, the Hopkinton company wished to have an adequate stock of studs on hand at all times.

The Harberry company had consistently made deliveries within two weeks to three weeks from receipt of orders for the studs. The Mixton Company indicated that on lots of 25,000 units it could make shipments within four weeks to six weeks. This increase in the period before shipment could be expected was not sufficiently great to be a cause for concern on the part of the purchasing officer. Since peak monthly demands of machine tool customers were always less than 10,000 units, it had been his custom to purchase when stock approached a minimum of 10,000 studs.

In spite of the considerable reduction in cost that would result from buying studs from the Mixton Company, the purchasing officer of the Hopkinton Meter Company was troubled by two elements in the situation. First, since he was reasonably certain that much of the new supplier's volume came from the automobile business, and since he knew further that during the last quarter of 1937 automobile production had declined considerably, the purchasing officer suspected that the Mixton Company was endeavoring to find business elsewhere to maintain volume. When automobile sales returned to normal, therefore, it was likely that the Mixton Company would be less interested in the Hopkinton company's business. Furthermore, the purchasing officer questioned the Mixton Company's ability to furnish parts for its normal trade and at the same time to make reasonably prompt shipments to the Hopkinton Meter Company.

Second, the purchasing officer seriously doubted the Mixton Company's ability to make a profit from selling the studs at 2 cents apiece. His own company's past experience in manufacturing these parts, as well as its close relationship with the Harberry company, indicated that any concern, no matter how modern its equipment, would be unable to machine the studs properly at such low prices and at the same time to cover its total manufacturing costs. The carrying charges on the equipment used by a screw machine manufacturer were very high. The purchasing officer believed, therefore, that rather than have its equipment stand idle, the management of the Mixton Company was endeavoring to make sales which would return something over the direct costs of material and labor.

The purchasing officer hesitated to accept the offer of the Mixton Company, fearing that one of two things would occur when automobile volume increased: either the Mixton Company would accept future orders for the studs only at increased prices and long-delayed shipments, or else it would find some excuse for abandoning the Hopkinton Meter Company as a customer. If the former situation occurred, the lowest price that could reasonably be expected was approximately 4 cents a unit, and it was likely that the delivery period would be increased from one of four to six weeks to a minimum of ten weeks.

69. MOUNTAINDALE ELECTRIC COMPANY

GRANTING SUPPLIER AN INCREASE IN PRICE AFTER CONTRACT HAS BEEN PARTIALLY EXECUTED

In the early fall of 1931 the director of purchases and stores of the Mountaindale Electric Company was informed by the president of the Jackson Electric Manufacturing Company, one of its suppliers, that under the existing contract his company was supplying the Mountaindale company at a loss. The Jackson company had had adequate opportunity to figure its costs before it made a firm bid which was to be effective until the end of 1932. The director of purchases and stores considered the advisability of revising the terms of the contract.

The Mountaindale Electric Company was a large electric power and light operating company serving a population of about 3,000,000 people in one of the western states. The activities of the company were widespread geographically, with several hundred substations and a number of steam and hydroelectric generating plants scattered over several thousand square miles of territory. The company had found it advantageous to connect these activities by a company-owned telephone system.

The executives of the Mountaindale Electric Company had followed a policy of conducting business relations with its customers and suppliers on a high ethical basis. Whenever possible, solutions to problems confronting the company were based on fundamentally sound economic principles rather than on what seemed to be most expedient at the moment. The purchases and stores department had gained a reputation for being very just in its dealings.

Annual purchases amounted to approximately $15,000,000, exclusive of new construction work. The director of purchases and stores reported directly to the president, who was also general manager of the company.

Prior to 1931 the company had, from time to time, manufactured in its own shops some of the items of special equipment which it required in its operations. In January of that year, however, the executives of the company decided that henceforth the company's shops should be used for repair and reclamation work only and that all items previously manufactured should be purchased from qualified suppliers. The executives believed that the new policy would be more in line with the aims and purposes of a public utility operating company than the old policy had been.

One of the products required by the company was known as a serjdetour, a device used to protect the company's telephone equipment from high voltages. The serjdetours were made in two models, a square type and a round type, the latter having a smaller capacity than the former. The weight of a serjdetour was about 20 pounds. The company's cost of manufacture had averaged $30.60 each for the square type and $28.55 each for the round type.

Because originally there was little demand for this special protective unit, and manufacturers of telephone equipment and supplies did not make such a product, the company had been obliged to manufacture its own serjdetours.

In the early part of January, 1931, the purchasing division was informed that the operating department expected to require approximately 76 square-type and 10 round-type serjdetours during 1931. A request was made for immediate delivery of 6 of the required square type. The buyer who purchased telephone supplies and equipment requested prices from the Follin Company, a local manufacturer of high-quality electrical equipment. He obtained a bid of $55 each on the order for the 6 square-type serjdetours which were required for immediate delivery. The buyer believed that this price was high, but, since the serjdetours were required immediately, the order was awarded without further negotiation.

On January 14, 1931, the buyer invited the Follin Company and the Jackson Electric Manufacturing Company to bid on 70 square-type and 10 round-type serjdetours. The latter was located over a thousand miles from the Mountaindale Electric Company's home office and had never before been contacted as a supplier. The company, however, was known to have a reputation for making products of the highest quality at reasonable prices. Both suppliers were furnished with samples of each type of serjdetour along with complete drawings and specifications.

On February 2, 1931, the Follin Company submitted a quotation of $85 each for the square type and $65 each for the round type of serjdetours, f.o.b. its plant. It was estimated that delivery charges would approximate 15 cents for each unit. On February 18, 1931, the Jackson Electric Manufacturing Company submitted a quotation of $29 each for both types of serjdetours, f.o.b. its plant. Delivery charges were estimated to be 91 cents each. The Jackson company's bid contained the following paragraph:

> If awarded this order, we will undertake to supply your serjdetour requirements up to the end of 1932 at $29 each, f.o.b. our plant, and you will have the privilege of ordering them in lots of one or any other quantity that you may need. We anticipate carrying them in stock.

The buyer was visited by the salesman from the Follin Company, who inquired about the order for serjdetours and was told that his price was rather high. The salesman then requested an opportunity to refigure the costs. The request was granted, and a revised price of $50 each for the square type and $40 each for the round type was submitted. The salesman stated that he had "figured incorrectly in computing the labor and material on the manufacture of a few of the units."

On March 9, 1931, the Jackson Electric Manufacturing Company submitted a revised price of $27.50 each, f.o.b. its plant, for both types of serjdetours. The reason given for the lower price was: "Have received more favorable quotation on ground Pyrex rings."[1]

The purchasing department in cooperation with the using departments followed the practice of attempting to determine whether prices quoted by suppliers were reasonable. This was done by estimating the amounts of materials, labor, and overhead in the item under consideration. In the case of the serjdetour, moreover, the company had had its own manufacturing experience. In the light of this experience and current information the buyer believed that the price quoted by the Jackson Electric Manufacturing Company was a fair price.

An order for 50 square-type and 5 round-type serjdetours was awarded to the Jackson Electric Manufacturing Company on March 18, 1931, at the quoted price of $27.50 each, f.o.b. supplier's plant. On June 29, 1931, an order was issued for an additional 25 of the round type at the same price. Both orders were filled to the entire satisfaction of the using departments.

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[1] One of the essential parts of a serjdetour.

On September 29, 1931, the buyer wrote to the Jackson Electric Manufacturing Company, requesting prices on 34 square-type serjdetours. Although the supplier had originally submitted a firm bid which was to be in force until January, 1933, the buyer believed that it was advisable to request new prices because, speaking generally, material and labor costs had declined since the original bids had been made. The following letter was received in answer to the request for prices:

October 7, 1931

Mr. A. R. Smith, Director of Purchases and Stores
Mountaindale Electric Company
Glen Building
Metropolis, Metropia

Dear Sir:

We have been expecting to get the labor cost down on serjdetours but now find that our cost including overhead on the square type is $32.77 and on the round type $30.75. This is without profit, f.o.b. our plant.

In quoting you originally, we wrote you that we would guarantee the price quoted for a period of two years, that is, $27.50, f.o.b. our plant, and you will, of course, be privileged to place your order for the 34 square-type serjdetours at the above price and it will be filled within 6 to 8 weeks.

The 34 square-type protectors at our cost and overhead of $32.77 plus freight would be $33.38, f.o.b. your plant, shipped according to your instructions. The approximate shipping weight is 860 pounds. Terms 1%, 10; net, 30 days.

Yours truly,
JACKSON ELECTRIC MANUFACTURING COMPANY
(Signed) W. L. Ecker, President

The director of purchases and stores was undecided as to what action to take. He believed in following, whenever possible, a policy of buying materials at prices which would allow his suppliers a fair profit. At times, however, he was at a loss to know what represented a fair price.

70. MARSH OIL COMPANY

PRICE POLICY DURING DEPRESSION

From time to time during 1931 the buyers in the purchasing department of the Marsh Oil Company were confronted with the problem of whether to discontinue purchasing from suppliers who had hitherto proved satisfactory and to award business to new suppliers who, in response to requests for quotations, were quoting lower prices.

For many years the Marsh Oil Company had been regarded as one of the foremost companies in the oil industry. It was a completely integrated unit, controlling its operations in the various branches of the industry through company-owned subsidiaries. In all, some 40 subsidiary companies owned oil wells, pipe lines, refineries, and domestic and foreign distribution systems.

Each of the various subsidiary companies was a complete business enterprise in itself and maintained an organization which was capable of performing all the duties required in the operation of a going concern. General management policies, however, were dictated from the executive offices of the parent company located in Philadelphia, Pennsylvania. The benefits of centralized purchasing were obtained through a system whereby the subsidiary companies were privileged to purchase through the purchasing department of the parent company whenever it was to their advantage to do so. In awarding contracts for the materials used commonly by the various companies, the purchasing department of the parent company made provision for the purchasing departments of the individual companies to place orders directly against the contracts. The subsidiaries were charged a commission on their total annual purchases made through the purchasing department of the parent corporation. The purchasing department spent approximately $85,000,000 annually for the materials, equipment, and supplies used in the operation of the business.

The purchasing department of the Marsh Oil Company was organized on a commodity group basis. Each group was in the charge of a buyer who was responsible for obtaining all information necessary to purchase properly the materials under his jurisdiction.

A purchasing director, who reported directly to the president, was in charge of the department and dictated all purchasing policies.

In negotiating with suppliers or prospective suppliers, the company had always encouraged a policy that would result in satisfactory relationships and fair dealing. In a statement of its purchasing policy the company advanced the following as one of its principles:

> From the seller as well as from the personnel of the purchasing department, we look for the strictest honesty and straightforwardness in all dealings and complete satisfaction of promises or representations made.

In so far as it had been possible, the purchasing department had encouraged stability of relationships with suppliers by using the facilities of those suppliers who offered satisfactory quality, service, and delivery, and whose prices were in line with those of competitors. The purchasing director believed that there were definite advantages in a policy favoring suppliers of long-standing service to his company. In times of great industrial activity when suppliers were pressed by customers for delivery of materials, it was the usual practice to provide for regular customers first; this policy of supplier loyalty was often used as a selling argument. There was also the very definite advantage of knowing, as a result of experience, the ability of the supplier to furnish consistent quality and prompt service. The purchasing director had found in the past that suppliers usually rewarded loyalty by submitting their best prices. He had, however, known of instances in which a supplier had taken advantage of a customer's friendship by submitting prices higher than were justified, in the belief that the customer, because of his confidence in the supplier, would not take the trouble to request other bids.

As a result of the depressed business conditions in 1931, the purchasing department of the Marsh Oil Company was besieged with salesmen whenever it became known that materials were to be purchased. Intense competition among the various suppliers resulted. The business of the Marsh Oil Company was considered very desirable because the company's size and financial strength insured large orders and prompt payment.

In April, 1931, the purchasing department received a requisition from one of the subsidiary companies requesting the purchase of 2,000 feet of 4-inch oil suction-and-discharge rubber hose, wire stiffened. Quotations were requested from the Everlasting Hose Company, the Wearwell Rubber Company, and the Universal Rubber Company. For several years past, the Universal Rubber Company had supplied the Marsh Oil Company with practically its entire requirements of this type of hose. The Universal Rubber Company had furnished high-quality products at prices equal to or lower than competitors' prices and had always made prompt deliveries. The relationship between this supplier and the purchasing department had been satisfactory in all respects.

The buyer received the following quotations from the three companies:

Universal Rubber Company	$2.10 per foot
Everlasting Hose Company	1.80 per foot
Wearwell Rubber Company	2.12 per foot

The low bidder, the Everlasting Hose Company, was a well-known manufacturer of rubber products with a background of 25 years of successful business experience. The company had adequate plant capacity to supply the regular requirements of the Marsh Oil Company as well as the requirements of other companies. Reciprocal relations did not exist between the two companies. In the past the Everlasting Hose Company had received one or two small orders from the Marsh Oil Company, but usually its prices had been higher than those quoted by the Universal Rubber Company. Everlasting hose was known to be of the best quality. All three companies were in a position to render adequate service.

In studying the quotations, the buyer was convinced that the Everlasting Hose Company was quoting a price that about equaled the cost of production. It was evident that the company was making an effort to obtain the business. There were rumors in the trade that the Everlasting Hose Company was greatly affected by the depressed business conditions and was trying to keep from shutting down its plants completely by taking business regardless of whether it made a profit.

The buyer talked with the purchasing director about the quotations to find out if he should inform the Universal Rubber Company that its prices were high and allow it another opportunity to submit prices. The purchasing department had previously stated its policy in regard to revision of prices as follows:

> Seller's initial price should be rock bottom and promptly submitted. There is seldom opportunity to revise price, and in case of revision other bidders should be given similar privilege.

The purchasing director gave serious consideration to the problem, realizing that any solution involved factors of more far-reaching importance than the immediate needs of the problem at hand. He was aware of the fact that many economists and business leaders were claiming that one cause for the continuation of depressed business conditions was the pressure for lower prices which was being exerted by the buyers for large industrial companies. A recent article in the *Journal of Commerce*, which had been called to the attention of the purchasing director, stated many of the arguments in the controversy.[1] This article, entitled

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[1] An answer to these and similar charges was made by the National Association of Purchasing Agents as follows:

Code for Buying and Selling

WHEREAS economic conditions resulting in a downward trend of prices are responsible for some vicious practices in buying and selling.

There is a deplorable tendency to place the blame on purchasing agents, accusing them of being unethical and unfair, ignoring the part that the seller has in the transaction.

Obviously the sensible remedy is to encourage fair buying and selling policies and the foundation for such policies is given in the code of standards for buying and selling sponsored by the National Association of Purchasing Agents.

THEREFORE BE IT RESOLVED that we, the members of the National Association of Purchasing Agents in convention assembled in Toronto, June 11, 1931, reaffirm our acceptance and support of that code, and

That we recommend the code be endorsed and applied by every industry, thereby substituting constructive action for destructive criticism in the campaign to improve standards of buying and selling.

Our Code

LOYALTY TO HIS COMPANY
JUSTICE TO THOSE WITH WHOM HE DEALS
FAITH IN HIS PROFESSION
From these principles are derived the N.A.P.A. standards of purchasing practice:

1. To consider, first, the interest of his company in all transactions and to carry out and believe in its established policies.
2. To be receptive to competent counsel from his colleagues and to be guided by such counsel without impairing the dignity and responsibility of his office.
3. To buy without prejudice, seeking to obtain the maximum ultimate value for each dollar of expenditure.
4. To strive consistently for knowledge of the materials and processes of manufacture, and to establish practical methods for the conduct of his office.

"The Tyranny of Buyers," was as follows:

> "We are no longer sellers of steel," said the president of the United States Steel Corporation in the address that he made last week before the American Iron and Steel Institute. "The large industries tell us what they will pay. Our commodities are sold at too low a price." This is a familiar complaint in a period of depression, when sellers of many kinds of products find themselves with surplus stock on hand or surplus productive capacity that adds to the burden of overhead costs. Some of the complainants, among them no doubt the leading manufacturer of steel, are only temporary sufferers whose sighs will probably subside when a revival of general business relegates tyrannical buyers to a less dominant position in the market.
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> Executives representing a wide variety of industries have, however, long been concerned about their growing defenselessness in the face of what threatens in some cases to become a permanent superiority of buying groups over selling agencies. An article in the current issue [June, 1931] of the *Atlantic Monthly*, "The Reign of Error," by J. H. Williams, who is himself a manufacturer, emphasizes the alleged handicaps of sellers in their dealings with buyers and calls for legalization of reasonable agreements in restraint of trade as a means of protecting defenseless industrial producers against the machinations of ruthless bargaining buyers. "When an industry is controlled by a few merged corporations," the writer says, "the sellers to that industry are not free to deal or not to deal; they face the alternative of dealing at the price the purchaser dictates, which may be ruinous, or of going out of business."
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> Mergers induced by competitive pressure have, however, developed sporadically, with the result that in some lines of business a few large customers may beat down the prices of relatively weak sellers. In other cases, dominant manufacturers may arbitrarily dictate sales terms to scattered and unresisting independent buyers forced to submit to discriminations that often lead to their ultimate extinction without regard to their relative efficiency and ability to survive in a fair field with no favors.

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5. To subscribe to and work for honesty and truth in buying and selling, and to denounce all forms and manifestations of commercial bribery.
6. To accord a prompt and courteous reception, so far as conditions will permit, to all who call on a legitimate business mission.
7. To respect his obligations and to require that obligations to him and to his concern be respected, consistent with good business practice.
8. To avoid sharp practice.
9. To counsel and assist fellow purchasing agents in the performance of their duties, whenever occasion permits.
10. To cooperate with all organizations and individuals engaged in activities designed to enhance the development and standing of purchasing.

We Subscribe to These Standards
National Association of Purchasing Agents

The purchasing director of the Marsh Oil Company believed that his first duty was to buy economically for his company. At the same time he was aware that, if he encouraged buying practices which were economically unsound in their effects upon the seller, in the long run the whole business community would feel the effects. Thus his own company, which might be for a time aided by sharp practices, would eventually be affected adversely.

71. FRANSTOCK ELECTRIC COMPANY

BUYER'S FUNCTION IN PREVENTING UNWARRANTED PRICE CUTTING BY SUPPLIERS

For several years immediately preceding 1931 the prices paid for pole-line hardware[1] by the Franstock Electric Company had been relatively stable. The director of purchases of the company believed that the prices had been fair to both the buyer and the seller. In the early part of 1931 one of the manufacturers of pole-line hardware was known to have quoted prices which were substantially below those quoted by other manufacturers. Representatives of the other major manufacturers of pole-line hardware asked the director of purchases of the Franstock Electric Company if he intended to force them to meet the cut prices; they stated that it would be ruinous to their business to do so.

The Franstock Electric Company furnished electric light and power to approximately 3,000,000 people over a territory of several thousand square miles in the northwestern part of the United States. The company's home office was located in Seattle, Washington. Because of the rapid growth of population and industry in the territory served, the company had to make extensive additions to its facilities each year. The company operated both hydroelectric and steam generating stations and followed the policy of locating them where the natural advantages were the greatest. It had a comprehensive distribution system, and as new power stations were built it constructed new power lines.

The company had been ably managed from its inception and had achieved a splendid reputation both locally and nationally as a company which followed soundly conceived and well-executed policies and practices. In common with other well-managed public utility companies, it followed a policy of fostering and developing industries in the territory which it served. Its aim was, however, to encourage the establishment and growth of only those companies for which there was a definite economic need. Companies from other parts of the United States which promised to establish plants in the Franstock Electric Company territory and to become power customers if the company would buy from them were patronized only when there was a real need for their products.

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[1] Pole-line hardware consists of metal products required in the construction of power lines and telephone lines. Among such items are hooks, eyes, pole mounts, bolts, fasteners, brackets, and braces.

The director of purchases was in part responsible for the forward-looking policies practiced by his company; he firmly believed that a director of purchases was in a strategic position to aid his company in developing policies concerning relations with other companies, policies which were of real value in establishing sound business practices. In the Franstock Electric Company the director of purchases reported directly to the president, who also served as general manager of the company. The purchases of the company amounted to about $15,000,000 annually, exclusive of new construction.

The director of purchases tried to conduct all relations with suppliers in such a way that there would be mutual confidence between the buyer and the seller. He frowned upon vicious price cutting by suppliers who were willing to sell their products at a loss. He stated his belief as follows:

> When we are reasonably well satisfied that any given industry is operating on an efficient, up-to-date manufacturing basis and is distributing its products in a proper economic manner and basing its selling price on legitimate costs plus a proper burden of overhead and profit, we are opposed as a matter of principle to measures which are calculated to break down such a structure to a point where operations become unprofitable and the industry suffers.

The director of purchases realized that it was often difficult to determine what was a fair price. In many instances it was necessary to trust the seller and to assume that he would take advantage of the most advanced practices in his industry, figure his costs accurately, and maintain a fair and consistent sales policy. In other instances it was possible to determine the quantities and value of materials in a product and to estimate labor and overhead costs so that an approximate selling price could be determined. Whenever possible the director of purchases visited suppliers personally in order to check on the production facilities and efficiency of operation in so far as he could by visual means and conversation with the executives of the suppliers' plant.

In the early part of January, 1931, the director of purchases noticed indications of price cutting among the makers and distributors of pole-line hardware. One of the municipally owned electric light companies in the territory served by the Franstock Electric Company requested bids on certain of its requirements of pole-line hardware. When the bids were opened,[1] it was found that one of the manufacturers from another section of the country had submitted prices approximately 65% off the recognized list prices used by virtually all reputable pole-line hardware suppliers. The regular discount off list prices to utilities was usually about 50%; the director of purchases believed that the 65% discount would result in a loss to the manufacturer.

Before price cutting had become apparent, the prices for pole-line hardware had been relatively stable for several years in the territory in which the Franstock Electric Company was located. Annual sales of pole-line hardware in this territory amounted to from $300,000 to $400,000 per year and were distributed among the following users:

6 electric light and power companies.
3 electric railway companies.
17 telephone and telegraph companies (exclusive of the Bell system, whose purchases were made in the East).
8 municipal electric distribution systems.
5 oil companies which built power-line extensions for their own use.

The director of purchases of the Franstock Electric Company estimated that his company used about 50% of the pole-line hardware sold in the territory.

The market for pole-line hardware in this territory was supplied by the following agencies:

Directly by the Manufacturer.—Peabody Company of Washington, a local branch factory of the Peabody Manufacturing Company of Milwaukee, Wisconsin, which sold its products nationally.

Wholesalers.—E & L Electric Supply Corporation and Universal Electric Company.

Both companies were national distributors of electrical products and both sold the pole-line hardware manufactured by Jones & Company, one of the largest manufacturers of this line of products.

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[1] Most municipal and state governments, as well as the Federal Government, were required by law to buy from the lowest responsible bidder. The law also required sealed bids. On a specified date and at a specified time the bids were opened publicly, and shortly thereafter they were made available for inspection by anyone interested.

Manufacturers' Agents.—Consolidated Electric Company, a local company which sold Power Material Company products. These products also had national distribution.

Travers & Ward, distributors on the Pacific Coast and in the Northwest for hardware made to specification by the Reinhold Manufacturing Company and the Gill Bolt Company, both of which were located in the western part of the United States.

The Franstock Electric Company had followed a practice of buying from all five of the distributors and had fostered the goodwill of these suppliers. Although only five suppliers of pole-line hardware were actively engaged in the territory, the potential suppliers were numerous. The company was solicited continually, both by mail and by salesmen of manufacturers who would have liked to extend their sales into that territory. The director of purchases, however, having taken into consideration the fact that the territory was well provided with dealers for the amount of business that was available, had not given orders to any outside suppliers. He summarized his reasons for patronizing the five local suppliers as follows:

1. They all have local warehouses and the sales and service forces necessary to render good service.
2. They anticipate our requirements and carry local stocks accordingly.
3. The local Peabody Company's plant is located on our power lines.
4. The E & L Electric Supply Corporation and its parent company and the Universal Electric Company have done a great deal to promote the use of electricity and to develop goodwill for the electrical industry through national advertising, research, and other means.
5. The three manufacturers, the Peabody Company, Jones & Company, and the Reinhold Manufacturing Company, have contributed to the development and improvement of pole-line hardware through their own engineers and in cooperation with the utilities.
6. All products are of the highest quality.

Before the price-cutting incident, prices had been established by what was known in the trade as a national list. This was in most cases the price list of one of the larger manufacturers, such as the Peabody Company or Jones & Company. Although there were neither secret price-fixing agreements nor a trade association for pole-line hardware manufacturers, the suppliers of pole-line hardware had usually followed the prices quoted in the national list.

Shortly after the director of purchases had noticed the price-cutting tendencies of one of the manufacturers of pole-line hardware, he was approached by representatives of the five established pole-line hardware suppliers, who asked if the Franstock Electric Company intended to force them to meet the prices of outside competition. They stated that it would be ruinous to their business to meet the cut prices. The director of purchases requested the opportunity of making a study of the situation before giving an answer.

He began his investigation by attempting to find out where, when, and why price cutting had started. He discovered that in October, 1930, certain of the small manufacturers in the East had attempted to take orders along the Atlantic Coast away from their competitors by offering special inducements, usually in the shape of confidential discounts. The discounts did not remain confidential very long and, when discovered, induced retaliations which eventually destroyed all semblance of a reasonable price structure throughout most of the country east of the Rocky Mountains.

The director of purchases found that in the production facilities for making pole-line hardware there was a great overcapacity, which had been aggravated by a severe contraction in the demand for this product. He learned from reliable sources that the estimated demand for this product in 1930 was only about 60% of the demand in 1929. He was told on good authority, moreover, that some of the largest manufacturers of pole-line hardware had made less than 6% net profit on their invested capital in 1929, the year of the greatest demand for pole-line hardware in the history of the industry. Indications were that some of the smaller companies in the industry had taken losses on their pole-line hardware business in nearly every year since 1922 and were able to continue in business only because they manufactured other lines of products on which they were able to make a profit.

After a consideration of the facts which he had gathered together, the director of purchases was undecided as to what action he should take. He was reasonably certain that, if he agreed to continue paying the prices which had been in effect before the price cutting started, the other buyers in his territory, who were in general in favor of a policy of fair prices, would support his action and do likewise. Municipal government purchases would continue to be made from the lowest bidder as was required by law. In general, however, it could be expected that pole-line hardware prices in the Northwest would be stabilized at a fair price.

On the other hand, the director of purchases considered the argument that, if he accepted the lowest prices he could get and wherever possible pushed the price cutters to the limit by loading them up with unprofitable business, he might be able either to make them see their stupidity or cause some of the weaker companies to go out of business. He recognized that it was hard for a buyer to determine just what was a fair price. In a letter to one of the distributors of pole-line hardware, he expressed the following thoughts:

> There are some very important underlying economic factors in connection with various industries which cause us at times to question seriously what is a proper price structure for a given industry. Take, for instance, your own pole-line hardware line. If my observation is correct, the investment in this industry throughout the country in plant, distribution facilities, and organization is excessive in proportion to the amount of business available. Is it to be assumed that we, as buyers, are to feel justified in paying prices which will earn for the owners an adequate profit on this excessive invested capital, and thus continue to encourage others to enter the same field with a consequent recurrence of selling antagonism; or is it the sensible thing to take the position that overcapitalization should be reduced by consolidations, absorptions, or otherwise, with a consequent reduction of the capitalization upon which earnings are demanded and an increased load factor on a fair number of stable units?

SECTION IX

FORWARD PURCHASING

72. GREENVILLE GAS COMPANY

PURCHASE BY ANNUAL CONTRACT

The Greenville Gas Company, a public utility engaged in the manufacture of gas, contracted annually with a coal mining company for its year's requirements of coal. The contract provided for reductions in shipments in the event of causes beyond the control of either the seller or the purchaser and also for changes in the price in accordance with changes in labor rates. In 1922 the public utility company thought that it might be advisable to discontinue the annual contract plan and to purchase coal in the spot market in the producing region as needed.

The daily consumption of coal by the Greenville Gas Company was about 500 tons. In order to be assured of a continuous supply, the company normally stored 60 days' requirements at the plant. The coal used in the manufacture of gas was of a highly volatile type. The company had confined its purchases to one district in West Virginia. Until 1921 the Greenville Gas Company had placed a contract for its annual coal supply in March of each year. The contracts had been given regularly to the same company. Each was a typical coal contract containing the provision:

> In case of strikes, accidents, or other causes beyond the control of the seller, or hindrances interfering with the mining and shipping of coal, the shipments will be reduced in the same proportion as the rated capacity of mines from which this coal is supplied is curtailed. The buyer is likewise entitled to suspend or reduce shipments of coal when similar causes beyond the buyer's control interfere with the operation of the buyer's use of said coal. [It provided further:] The price named in this contract is based upon the existing rates of pay for all mine labor, and the price will be subject to readjustment in the event existing rates of pay are changed.

Early in 1921 a question was raised as to the advisability of a continuance of the annual contract plan. Coal and labor prices in general were falling. Another disturbing element was transportation difficulties. The experience of the Greenville Gas

Company had been that coal contracts were binding upon the purchaser in that he was required to take the coal as delivered under the terms of a contract; yet in the event of mining or transportation difficulties no means had been devised to enforce or insure deliveries. In 1920, when railroad difficulties handicapped the coal company's deliveries, the gas company had waited in anticipation of a resumption of shipments until the supply on hand at the plant had become so low that a shutdown was threatened. In order to supply gas to its customers, the company had been forced to enter the open market and purchase spot coal at a price much higher than the contract price. In view of this experience the contract which normally would have been let in March, 1921, was not signed until June 1 of that year.

In February, 1922, shortly before the calling of a coal strike in all the near-by union fields, the coal company notified the gas company that the price of coal was to be advanced 40 cents a ton. This increase was considered fair by both companies because of the higher production costs. Although the rates for the sale of gas fixed by the local public utilities commission had enabled the gas company to show satisfactory net earnings in 1921, this increase of 40 cents a ton in the price of coal left small margin for contingencies.

In February, 1922, the coal company also asked the gas company to renew its contract for the ensuing year. The latter was reluctant to assume a long-term contract in view of its experience during the preceding two years. In addition it expected that later in the year the price of coal would decline nearly to the prewar level. Although the coal company was in a nonunion district entirely surrounded by union fields, it anticipated little labor trouble for it always had paid as liberal wages as were paid in union mines. The coal company also owned a large supply of private cars. The Greenville Gas Company was located near the seaboard so that deliveries were possible by either rail or rail and water. The distance from the mines by rail was about 700 miles through congested gateways and junctions. The rail and water route was 400 miles from the mines to tidewater and 500 miles from tidewater to the port nearest to the Greenville Gas Company.

If the gas company did not sign a contract but instead relied upon the West Virginia open market, it would have to take into consideration the fact that the gas coal fields were small and not widely separated. It was probable that the transportation problems of one field would be the same as those experienced by neighboring producers. On the other hand, the annual coal contract contained so many safety clauses in the event of mining or transportation difficulties that there was practically no legal obligation on the part of the coal company to make deliveries in emergencies. At the time that the contract was offered, the gas company believed that there was little to be gained by acceptance and that advantages from price declines occurring later in the year might be lost.

73. LOGAN LEATHER COMPANY

SPECULATIVE PURCHASING OF HIDES FOR PROTECTION OF COMPETITIVE POSITION

The Logan Leather Company, a tanner of side leather, sold its product to manufacturers of medium-quality shoes for use as upper leathers. Annual sales normally approximated $5,000,000 and were made chiefly through the main offices located in Boston. Annual purchases of hides amounted to about $2,500,000. Although the company was not in a position where it had to speculate in order to realize a profit, it did take advantage of speculative opportunities in a rising hide market and was, therefore, faced with the problem of how to avoid a serious financial loss which might result from an error in judgment.

The Logan Leather Company purchased low-quality hides and converted them into medium-grade upper leather. Like others of its type, the company operated on a relatively large scale as compared with the smaller, more specialized tanners of high-grade calf leather. The increased style element in shoes had resulted in demands for many and varied types of leather, so that the Logan Leather Company had an important merchandising problem in determining what leathers to produce to satisfy shoe manufacturers' requirements. The problem involved forecasting shoe manufacturers' demands approximately 22 weeks in advance because, under normal conditions, a period of this length elapsed before the hides purchased were sold as finished leather. The company's leathers were sold primarily to manufacturers of men's and boys' shoes. Sales were made to manufacturers of women's shoes only when a leather happened to be suitable.

All purchases of hides were made through the home office by a specialized hide buyer, who reported directly to the president (see Exhibit 1). The company purchased domestic green salted buff, extreme, and kip hides.[1] All other purchases were made by the purchasing department located at the company's tannery in Wisconsin. Such purchases consisted chiefly of tanning materials and operating supplies and normally involved an annual expenditure of approximately $750,000.

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[1] All three of these grades were of country take-off. Buff hides were unbranded steer, cow, and bull hides weighing from 45 to 60 pounds; extremes (extreme lights) were unbranded steer, cow, and bull hides weighing from 25 to 45 pounds. Kips were veal skins weighing from 15 to 25 pounds; they were too heavy to qualify as calfskins, which weighed from 7 to 15 pounds. Each of these grades was given a numerical classification, No. 1, No. 2, etc., which indicated the quality of the hide in so far as imperfections were concerned. "Green salted" referred to the method of curing hides, those so designated having been salted and shipped in a wet condition as distinguished from dry salted hides.

In purchasing hides, the company patronized reputable brokers and large producers who were selected and maintained for their dependability in delivering hides in accordance with specifications. This policy was to the company's advantage since the purchase of hides from these reliable sources permitted the buyer to place an order without first inspecting the hides.

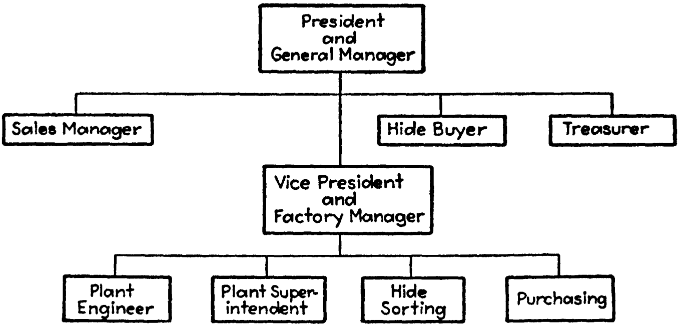

Exhibit 1.—Logan Leather Company. Organization chart.

The hide buyer was responsible for procuring those hides that could best be finished into the leathers required in the production plans drawn up by the executive committee, which was responsible for merchandising. This committee was composed of the president, treasurer, sales manager, and hide buyer. Being a member of the committee, the hide buyer was cognizant of new developments or changes in production requirements. Also he had to be familiar with such factors as origin, grade, weight, sex, month of take-off, and imperfections of the different classes of hides, since these characteristics affected the kind of leather produced. It was not always desirable to procure the same grade of hide for a particular leather since a greater yield and a better quality of leather might be obtained from higher-grade hides. Therefore the hide buyer constantly had to balance the value of the leather yield from different grades of hides against the price differentials existing between the grades. These price differentials were likely to fluctuate over short periods of time as a result either of changed conditions in the supply and demand for a particular grade of hide or of major swings in hide prices. For example, when in March, 1933, light native cow hides (the standard basis grade for Commodity Exchange, Inc.[1]) were selling at 4½ cents a pound, the company found it profitable to use higher grades than those used when light native cow hides were 14 cents a pound with a proportionately larger differential between grades.

In the opinion of the executives, the company did not have to speculate in hides in order to show an operating profit, since such profit was obtained primarily through manufacturing and merchandising efficiency. In actual practice, however, the company did at times speculate when purchasing hides, first, because the company officers believed that they were capable of speculating successfully and, second, because the relationship between leather prices and hide prices was such that the tanner assumed the risk of price lags between the two commodities.

Hide and leather prices fluctuated approximately together; when prices for hides fell, those for leather reacted immediately. When prices for hides advanced, however, there was an increase in the volume of leather sales at former prices rather than an immediate price advance. The extent of the lag in leather prices was largely dependent upon the hide and leather position of tanners. When large stocks of hides and finished leather were held by tanners at the time of an increase in the prices of hides, frequently a period of six months or more elapsed before prices were completely adjusted. On the other hand, when stocks of hides and leather held by tanners were low, the adjustment was completed in a much shorter period. Beginning in April, 1933, for example, there was a substantial rise in the price of hides. Immediately preceding that period, the bank holiday, the unsettled political situation, and deeply depressed business conditions had caused tanners to keep stocks at a low level. Consequently the adjustment in leather prices was completed in approximately 30 days, an unusually short period for such an adjustment.

The Logan Leather Company followed the policy of increasing its stocks of hides in anticipation of a rising market. Only those hides which were used in the production either of several different leathers or of leathers for which there was a stable demand were purchased on this basis, however. When a decline in hide prices was anticipated or when the price trend was uncertain, the company curtailed its stock of hides on hand to a minimum. At no time did the company's speculative policy involve the purchase of hides for resale or the accumulation of finished goods.

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[1] In 1933 the New York Hide and Skin Exchange, Inc., the National Metal Exchange, Inc., The Rubber Exchange of New York, Inc., and the National Raw Silk Exchange, Inc., combined to form Commodity Exchange, Inc.

In June, 1938, the Chicago Mercantile Exchange began dealing in hides.

The Logan Leather Company did not trade on Commodity Exchange, Inc., for several reasons. In the first place, the president of the company did not consider the market broad enough for hedging purposes. In his opinion, there was little outside interest represented on the exchange; the transactions were all made by a restricted group of packers, speculators, and leather tanners. Individual contracts of large operators were likely to cause price fluctuations unjustified by actual market conditions; in some instances it was believed that the market was manipulated by large operators. Furthermore, although the company frequently purchased hides on contract, the executives did not consider the exchange satisfactory for this purpose because of the following rule: "The seller shall have the option of delivering any one of the tenderable grades . . . at the differentials fixed in the By-Laws. . . . "[1] In other words, any grade of hide might be delivered as fulfillment of a contract as long as an adjustment was made for the price differential, which was fixed by the Adjustment Committee for Hides, between the grade delivered and the standard basis grade. Thus a contract made by the company might be met with a grade of hide which would be unsatisfactory for the particular requirements, and at the time of delivery the company would be forced to dispose of the hides at the best terms possible and to look elsewhere for raw materials. The company executives believed that the exchange, although useful to the packer since the latter could contract for future delivery irrespective of the grade or kind of hide he was taking off and since he could meet the contracts with the hides he happened to have on hand, was useless to the tanner inasmuch as he required particular hides for the leathers which he manufactured. Beside the unsatisfactory nature of the exchange for hedging or procurement purposes, the disturbing effect upon the spot market of what, in the president's opinion, were unjustified and uneconomic futures prices added a further hazard to the leather business.

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[1] Sec. 131-C of the By-Laws and Rules of Commodity Exchange, Inc.

Since the officials of the Logan Leather Company had not wanted to risk a large sum of money in speculative operations, and since they had found the possibilities of hedging on the exchange unsatisfactory, they had set up controlling devices to limit speculation, so that the company would not be financially handicapped should the market go contrary to the officers' judgment. The controls employed for this purpose were: (1) an operating budget, (2) contracts for future sales of finished leather, and (3) daily conferences of the members of the executive committee.

1. The operating budget controlled the physical volume of hides rather than the financial expenditures. It was drawn up by the executive committee and was originally to have been revised quarterly, but the varying demands of shoe manufacturers required more frequent changes. In practice, therefore, the budget was brought up for consideration whenever necessary.

The operating budget was prepared in two sections: the first contained a daily production schedule; the second fixed the maximum inventory figures for normal requirements of materials at the various production stages. The daily production schedule was based on general business conditions, the situation in the leather and shoe industry, and the sales outlook for the company. The schedule provided daily estimates as to the number of each type of hide to go into process. For example, on April 14, 1933, the production schedule was revised for the sixth time during the year. At that time a schedule was drawn up which provided that 1,050 buffs, 825 extremes, and 275 kips were to be transferred daily from the hide room at the plant into the first tanning process. This budget remained in effect until April 21, at which time the daily quantity of buffs scheduled into process was increased to 1,155.

The second section of the operating budget determined the maximum quantity of hides to be maintained in the following inventories: on contract and in transit, in stock at the tannery, in process, and in finished leather. At the beginning of 1933 the estimate of maximum hide requirements was as follows: four weeks' supply[1] should be kept on contract and in transit to the tannery; six weeks' supply should be kept in stock at the tannery; seven weeks' supply should be kept in process; and five weeks' supply should be kept in finished stock. In other words, after taking into consideration the company's working capital, storage and manufacturing facilities, and general policies, the officers believed that these inventories should serve to keep the tannery in operation and to provide a sufficient stock of finished products for prospective sales. The company's operations were limited by the maximum quantity set for each division of stock, deviation from which was possible only upon the approval of the committee. The weekly rate of operation multiplied by the specified number of weeks' supply of hides on hand and on contract limited the quantity of hides which might be purchased. The discretion of the hide buyer in determining stocks of hides was limited, on the one hand, by what he dared to carry as a minimum and, on the other hand, by the maximum provided in the budget. When the hide buyer, believing that prices were going to increase substantially, wished to make heavier commitments than the budget allowed, the matter was brought up for consideration by the executive committee. If the officers agreed with the hide buyer in his appraisal of the hide market, they would either revise the limits imposed in the operating budget or authorize the buyer to purchase a given number of hides in excess of the budget. During 1933 the number of weeks' supply of hides specified in the operating budget remained unchanged; when stocks were to be increased, the buyer was authorized to buy a definite number of hides in excess of the budget.

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[1] A week's supply was computed on the basis of the daily production schedules for a six-day week.

2. The second method of speculative control used by the company was to vary, in some measure, its orders for future delivery of leather in accordance with its need for protection on hide holdings.

Because of the differences in the quality of leather produced by various tanners, the establishment of uniform market prices for leather was impossible. Selling was therefore largely a bargaining process between the seller and the buyer. Since leather buyers were willing to place orders for future delivery of leather when prices were satisfactory, the Logan Leather Company followed the practice of using unfilled orders as a partial hedge of its hide holdings. In general the policy of the company was to have approximately 50% of the total hides owned by the company covered by sales contracts for future production of leather. The hides "owned" by the company included all hides committed for and owned, whether on contract, in stock, in process, or in finished leather.

3. The daily conferences of the president, treasurer, sales manager, and hide buyer were relied upon for controlling general operations and for coordinating the various functions of the business. When the advisability of making speculative purchases was under consideration, for instance, the financial, sales, and merchandising viewpoints of the problem were all represented. The president and treasurer followed events in the leather industry and were actively interested in the hide market. Although it was the hide buyer's prerogative to make hide commitments, within the limits imposed by the budget, in actual practice his decision pertaining to the amount of commitments represented the combined judgment of the officers.

The company officials subscribed to several commodity services and took advantage of all available statistical information in analyzing the hide market. The general business situation, financial and political conditions, trends in the leather and shoe industry, and similar factors were all given consideration. The general market appraisal of the buyer, treasurer, and president, however, was based in large part on the "feel" of the market, which was gained through contacts within the industry, with hide brokers, and with leather buyers.

74. LISBON SHOE COMPANY

FORWARD BUYING BY SHOE MANUFACTURER

The Lisbon Shoe Company, manufacturer of men's and boys' medium-grade shoes, sold its product primarily upon a price basis, although it had successfully established a reputation for quality in the low-price field. Since Lisbon shoes were subject to severe price competition from shoe manufacturers who placed less emphasis upon quality, the company made every effort to keep its costs at a low level. One method devised for this purpose was to make forward commitments in raw materials when prices were expected to rise, and to reduce stocks below normal when prices were expected to decline. In the early part of 1933, when hide and leather prices were low, the company purchased large quantities of these commodities and was thereby in a position to sell shoes at low prices for several months longer than it otherwise could have done.

The Lisbon Shoe Company normally produced 1,000,000 pairs of shoes[1] annually and distributed them chiefly through chain-store organizations. Raw material purchases for this volume of production required an expenditure of $1,500,000, of which $500,000 was for sole leather, $650,000 for upper leather, and $350,000 for findings and miscellaneous supplies. All purchases of hides or leather were made by officers of the company.

The sales department of the Lisbon Shoe Company prepared sales estimates on the basis of information obtained from its distributive outlets. These estimates were drawn up in two forms: one for production scheduling and the other for procurement purposes. The sales estimate which was submitted for production scheduling was compiled on the 5th of each month and showed: (1) actual orders for the period from the 20th to the end of the current month, and (2) an estimate of orders for the period from the 1st to the 10th of the following month. Similar sales estimates were drawn up on the 15th and 25th of each month.

The sales estimate which was submitted for procurement purposes was compiled at the beginning of each of the two semiannual selling seasons and contained an estimate of the total number of shoes to be sold. The two seasons in the shoe industry were designated as spring and fall. All styles for the spring season of the coming year were determined by the middle of November. The total number of shoes to be sold during the spring season was estimated in the latter part of November. Production for this season began in January and extended through June or early July. Styles for the fall season were determined during May, and the total number of pairs of shoes to be sold during the season was estimated before the end of that month. Production for the fall season extended from July to December.

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[1] The 1932 and 1933 monthly production figures for the industry as a whole were as shown in Appendix A.

On the basis of these seasonal estimates, the Lisbon Shoe Company placed orders for early-season requirements of hides and leather. Although shoe designs were subject to some modification because of style changes, the company found that, in the low-price class, style changes were of such a character that they did not particularly affect either the types of leather or the proportions of each type required. Those changes which did affect raw material requirements were more in the nature of trends from one season to another and could therefore be forecast within reasonable limits. An increase in the popularity of men's sport shoes, for example, had resulted in a considerable increase in the consumption of white leather, but the change had been gradual and was taken into consideration in estimating requirements.

The procedure followed by the company in determining its raw material requirements was to convert the season's estimated shoe sales into the total quantities of upper leather and of sole leather required in accordance with normal usage. Total sole leather requirements computed in this way needed no further breaking down. Total upper leather requirements were converted into the various types and colors of leather on the basis of past experience, after adjustments were made for any style trends. The company's seasonal sales estimate and method for determining raw material requirements were sufficiently accurate to permit the procurement of material six months or more in advance. Only when price conditions made it advisable, however, did the company purchase this far in advance, and then it confined its purchases to the more staple lines of material. In general the company considered that three months' supply of upper leather, four months' supply of sole leather, and three months' supply of other materials were normal quantities to be kept in stock or on contract for delivery. The minimum quantity of upper leather with which the company could operate safely was a three weeks' supply at the plant and an additional one and one-half months' supply on contract. The minimum amount for sole leather was two and a half months' supply. The average minimum supply of other items was approximately two months' requirements.

The company executives believed that for the company to maintain its competitive position it had to procure leather at less than average market prices. Since the cost of sole leather represented 24% of the total cost of a finished shoe, upper leather 31%, and other materials 12%, savings in prices paid for raw materials obviously had a substantial effect on the cost of the shoe. The Lisbon Shoe Company followed the policy of increasing stocks of all materials when prices were low and of decreasing stocks to the minimum quantity of supply when prices were expected to decline. The company's policy of forward buying was largely confined to upper leather, sole leather, and hides to be tanned into sole leather, since these commodities were more speculative than the other items which the company purchased. As a matter of policy, however, the company did not make forward commitments for more than a six months' supply of any material except in rare instances.

Although the company could alter its commitments for upper leather by varying its stock of leather maintained at the plant, it more frequently did so by varying the amount of leather covered by contracts for future delivery. All purchases of upper leather were made from tanneries, occasionally on the spot market but usually on contract. Since the leather requirements of the Lisbon Shoe Company were comparatively large, it was necessary for the company to maintain more or less regular sources of supply and to contract in advance for its requirements to insure their availability at the time required. The company maintained three or four sources for each type of leather, and not infrequently one firm would be listed as a source for several leathers. Since tanneries tended to specialize in certain types of leather, it was necessary for the company to have several groups of suppliers. Thus, one group of suppliers was patronized for kid leather, another for calf leather, and yet another for side leather. No contractual agreements existed between the company and these sources with the exception of contracts for delivery of specific orders. In this way the company was free to bargain with its regular suppliers or any other tannery if it so desired. Also the company could take advantage of opportunities to purchase leathers from tanneries that happened to have an excess supply of a given leather which they were willing to sell at a sacrifice price.

Only a small portion of the company's sole leather was purchased from tanneries. The company followed the practice of buying hides and having them tanned into sole leather whenever the spread between hide prices and sole leather prices made it profitable. An average of 75% of the company's sole leather was procured in this way. In general this method had the advantage of placing the company in a position where it avoided paying the selling cost of the tannery and also assumed the risk of fluctuations in hide prices with the accompanying possibility of profitable speculation. All tanning of this nature was performed by a tanning firm at a contract price per pound of finished leather. The company did not procure its entire sole leather requirements in this way because it believed that it should leave a margin as a hedge against volume fluctuations. Furthermore, this margin enabled the company to take advantage of occasional conditions of supply and demand in the sole leather market which caused the price of sole leather to fall to a point lower than the cost of raw materials and processing. On such occasions the company purchased sole leather on the spot market, sometimes to such an extent that the leather produced on contract had to be stored until prices were more normal. Fluctuations of a few cents in hide prices had a pronounced effect on sole leather prices, since the average cost of the tanning process in the industry was approximately 10 cents per hide pound.

Early in 1933, when hide prices had declined to their lowest level since the World War, the company purchased substantial stocks of leather and hides. Forward commitments of upper leather were extended as far as suppliers would contract for delivery. The company's purchases of black calf leather, the largest single type of upper leather used by the company, are illustrative of the company's buying procedure during the early part of 1933. Before the end of the first quarter of that year, the company had placed futures contracts for black calf leather to meet all its requirements during the second and third quarters. On April 1, the company held contracts for the future delivery of 1,650 dozen black calfskins[1] at prices ranging from 19 cents to 20 cents per square foot. During the second quarter of that year, the price of this grade of black calf averaged approximately 25 cents per square foot, and during the third quarter approximately 29 cents.

In procuring sole leather requirements, however, the company was not limited by the extent to which tanners would make forward commitments, since its practice of having hides tanned into sole leather allowed it to contract in hides as far ahead as it desired. The hides best adapted to the company's sole leather requirements were selections[2] of Colorado steers, heavy Texas steers, and butt-branded steers. At the end of the first quarter of 1933 the company owned 9,500 hides[3] which had been procured at an average cost of 3.95 cents per pound. Part of these hides were held in warehouses, and part were on contract for future delivery from meat packers. This quantity of hides was sufficient to cover the company's sole leather requirements for the remainder of the year, although during the fourth quarter it made commitments for the sole leather needs of the early part of 1934. During the second quarter of 1933 the average price of the grades of hides used by the company was 9.25 cents per pound, and during the third quarter 13.1 cents per pound.

On July 20, 1933, the company had an opportunity to sell its entire holdings of hides at a substantial profit.[4] If this had been done, however, the company would have been forced to purchase its sole leather requirements in the spot leather market and thereby would have lost a very desirable competitive advantage. For this reason the offer was rejected, and the company postponed increasing its selling prices until December 1, 1933, in the hope that lower retail prices would be maintained. The sales volume of the company during the last half of 1933 was 32% greater than for the same period in 1932.

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[1] Black calfskins averaged approximately 150 square feet per dozen skins.

[2] "Selection" refers to No. 1, No. 2, etc., qualities of the indicated grade. The standard price differential between No. 1 and No. 2 selections of all hides was 1 cent per pound.

[3] Colorado, heavy Texas, and butt-branded steer hides averaged approximately 60 pounds in weight.

[4] The offer for the company's holdings of hides was 14¼ cents per pound—only slightly below the market quotations for No. 1 selections, which were stated in Commodity Exchange, Inc., *Daily Market Report* for July 19, 1933, as follows: Colorado steers, 14½ cents; butt-branded and heavy Texas steers, 15 cents. The monthly prices for 1933 for No. 1 selections of these grades of hides were as shown in Appendix B.

APPENDIX A

MONTHLY PRODUCTION OF SHOES IN THE UNITED STATES, 1932–1933

(In units of 1,000 pairs)

Month	1932		1933	
	Men's shoes	Boys' and youths' shoes	Men's shoes	Boys' and youths' shoes
January	5,176	1,423	5,763	1,442
February	5,853	1,490	6,092	1,448
March	6,644	1,663	6,837	1,532
April	5,343	1,270	6,217	1,607
May	5,424	1,112	8,362	1,683
June	5,851	1,183	9,040	1,932
July	5,135	1,181	8,328	1,993
August	6,822	1,613	9,138	2,103
September	7,886	1,846	7,656	1,711
October	8,044	1,997	8,293	1,827
November	6,917	1,810	6,909	1,515
December	5,397	1,513	6,186	1,150

Source: *Survey of Current Business.*

APPENDIX B

WEEKLY PRICES OF NO. 1 SELECTIONS OF COLORADO, BUTT-BRANDED, AND HEAVY TEXAS STEER HIDES, 1933

(In cents per pound)

Week	Colorado steers	Butt-branded and heavy Texas steers
January:		
1st week	5	5½
2d week	5	5½
3d week	5	5½
4th week	4½	5
February:		
1st week	4½	5
2d week	4½	5
3d week	4	4½
4th week	4	4½
March:		
1st week	4	4½
2d week	5	5½
3d week	5½	6
4th week	5½	6
April:		
1st week	5½	6
2d week	5	5½
3d week	5½	6
4th week	7	7½
5th week	7½	8
May:		
1st week	8½	9
2d week	9¼	9¾
3d week	10	10½
4th week	10½	11
June:		
1st week	11	11½
2d week	12	12½
3d week	12	12½
4th week	12	12½
5th week	12	12½
July:		
1st week	12½	13
2d week	12½	13
3d week	14½	15
4th week	14½	15
August:		
1st week	14½	15
2d week	14½	15
3d week	14½	15
4th week	14½	15
5th week	13½	14
September:		
1st week	12½	13
2d week	12½	13
3d week	12½	13
4th week	12	12½
October:		
1st week	10	10½
2d week	9½	10
3d week	9½	10
4th week	9	9½
November:		
1st week	9½	10
2d week	9½	10
3d week	10	10½
4th week	10	10½
5th week	10	10½
December:		
1st week	10	10½
2d week	9½	10
3d week	9½	10
4th week	9½	10

Source: January through May, 1933, *Daily Market Report* of the New York Hide and Skin Exchange, Inc. June through December, 1933, *Daily Market Report* of Commodity Exchange, Inc.

75. COSTIGAN SHOE COMPANY (A)

FORWARD BUYING BY SHOE MANUFACTURER

Late in May, 1936, the purchasing committee of the Costigan Shoe Company, an Illinois corporation engaged in the manufacture of men's shoes, met in accordance with its usual practice to determine the company's leather buying policies for the ensuing season. The purchasing committee was composed of the president of the company; the comptroller, who was also sole-leather buyer; and the upper-leather buyer. The informative material presented to the committee by the comptroller, who had charge of its collection, included detailed estimates of the company's sole-leather and upper-leather requirements through to the end of the year. At this meeting the committee considered the extent to which the company should make forward commitments on sole and upper leathers and the desirability of borrowing through note brokers for the purpose of increasing raw material inventories.

Prior to each shoe season the comptroller prepared a financial budget. The preparation of the budget began with independent estimates of prospective sales submitted by the president, the sales manager, and the manager in charge of the stock department and inventory. The president and the sales manager based their estimates, which were total figures only, on general business conditions, opinions advanced by the retail trade, and their own knowledge of market conditions. The manager in charge of the stock department and inventory estimated total sales for each of the company's 200 styles of shoes, basing his figures on past sales records and salesmen's reports of their anticipated volume. From these three independent estimates a final budget of total sales was prepared, and the estimate by styles was readjusted to this new figure. Using this final sales budget as a basis, the comptroller worked out a production budget for each style and a budget of manufacturing expense by months. He then used the production budget as a basis for estimating the company's upper-leather and sole-leather requirements for the period, for each kind of leather used. A comparison of these requirements with the company's holdings was next made in order to determine the amount of each kind of leather which should be purchased during the season to cover production needs. The purchasing committee then tentatively decided at what times and in what quantities this leather should be purchased.

After the final monthly budgets of physical sales and production volumes, and costs of manufacturing, materials, selling, administration, and advertising had been agreed upon by all executives involved, the estimated sales, receipts, and total costs of doing business were computed in a cash budget. This gave the company a basis for estimating its cash position at the end of each month of the period and enabled it to plan its bank loans in advance. All the figures entering into the budgets were provisional and subject to modification at any time. Thus, if conditions warranted, the purchasing committee might reconsider its recommendations and change the dates and amounts of purchase.

The Costigan Shoe Company used only two grades of sole leather, both of which were of high quality since it was the company's policy to manufacture only better-grade shoes. Each grade was purchased in five irons or weights. About 80% of the company's sole-leather requirements was purchased in the form of cut soles, usually in small lots, although occasionally the company purchased 300 or 400 cases of 60 pairs at a time. The remaining 20% was purchased in the form of whole stock, which was cut by the company to its own requirements.

The company's purchases of both whole leather and cut stock for soles were made principally from four tanners with whom the company had done business for many years. Occasionally, however, the company purchased small lots from other tanners. Before buying whole stock, the company had each tanner submit from 50 to 75 sample bends. After cutting the soles and examining them for quality, the company placed orders, usually for carload lots of bends, with the tanner or tanners whose merchandise was most satisfactory on a price and quality basis. When a purchase of whole leather was received, the company cut the soles and then carefully examined them for quality. Those soles that did not meet the rigid specifications were sold to manufacturers of lower-price shoes. About one-third of the soles cut by the company were disposed of in this way. The company's contracts for the purchase of cut soles provided for minimum specifications and the return to the tanner of all unsatisfactory merchandise.

The company's requirements of upper leather were much more varied than those of sole leather. In the manufacture of the 200 styles of shoes in its line, the company used approximately 50 kinds and colors of upper leather in 150 grades and weights. For purposes of forward purchasing, however, only about 20 kinds of upper leather were important enough to follow closely. The remainder were purchased as required to replenish stocks of finished shoes or to fill orders already received.

The company's requirements of upper leather were for kid, buck, and calf. These leathers were purchased from about 10 different sources, each source producing only one of the three required types. Upper leather was purchased in the form of tanned whole hides and skins and was cut by the company. Prior to making contracts for purchase, the company cut up samples submitted by individual tanners. When the results of the cutting were satisfactory, the company offered the vendors certain prices per square foot for the lots from which the samples had been taken. If, after negotiations, mutually satisfactory prices were agreed upon, the company made the purchases.

It was not necessary for the Costigan Shoe Company to maintain leather at all times in order to insure continuity of supply since substantial stocks of leather in all standard grades were ordinarily available from tanners for immediate delivery. Any standard leathers could be obtained within 10 or 12 days from the tanneries and within 2 days from tanners' warehouses located within a few miles of the factory. Delivery from warehouses, however, was not advisable because of an additional freight charge levied on such merchandise. Purchases from warehouse stocks were therefore made only when absolutely necessary and then confined to small quantities sufficient to cover production requirements until shipment could be made direct from the tanneries. Even when temporary shortages of standard grades existed, as happened occasionally, and the company found itself unable to obtain its full requirements for months in advance, arrangements were easily made with suppliers for fill-in shipments in quantities sufficient to allow the maintenance of production schedules.

On some special grades of upper leather, however, the company could not be certain of obtaining satisfactory delivery. For example, some grades of white buck for spring shoes were available only in limited quantities at the beginning of each production season. Before the supply of this item was exhausted, it was necessary to place an order large enough to cover the company's full requirements for many months in advance. This situation was exceptional, however, and the company as a general rule could expect to be protected against shortages of raw materials even when it purchased on a hand-to-mouth basis.

During 1929 purchases of leather for stock styles were confined to immediate production requirements, and leather for nonstock styles was purchased only as orders were received. This policy was followed partly because the company's records were unsatisfactory for forward buying purposes and partly because the prices of raw materials were falling. The officers in charge of purchasing had not given much attention to the available statistics on the hide and leather situation when estimating probable price trends, but had based their recommendations for purchases primarily on hunches and personal contacts with the market.

In 1930 a new comptroller, Mr. Reynolds, was hired by the company. He had formerly been employed as the sole-leather buyer for one of the largest shoe manufacturing concerns in the United States. During the first few years in which he had been engaged in buying soles for that company Mr. Reynolds had relied upon his market contacts for information regarding price movements and had made his purchases on the basis of his own personal observations. In 1926, however, he began to appreciate the usefulness of statistics on wettings, production and stocks of hides, number of cattle, hide and leather prices, and boot and shoe production. Thereafter he filed all available information with reference to conditions in the trade and used this material, supplemented by visits to the market, as a basis for estimating price movements.

Within two years after Mr. Reynolds had assumed the duties of comptroller for the Costigan Shoe Company, he had set up a control system for estimating sales and production of shoes by individual styles, salesmen, and outlets for six-month periods, from January to June and from July to December. From these figures the company's future raw material requirements by kinds of leather were determined, and the buying executives of the company were enabled to base their purchases on these estimates of future needs. Thereafter both Mr. Reynolds and the upper-leather buyer in their visits to the markets on purchasing trips were able to buy in any quantities up to the total required by the company for a definite period in advance; that is, they could buy individual kinds of leather up to August 1, September 1, or December 1, as appeared desirable.

Prices of hides and leather dropped steadily from 1929 until February, 1933. As a result, the hand-to-mouth policy followed by the company during this period was successful in protecting it against heavy losses from a raw materials inventory depreciation. In March, 1933, however, the members of the purchasing committee believed that prices, which then were at the lowest level in over 30 years, could not go much lower and that any increase in general business activity would bring a general commodity price advance, in which hide and leather prices would participate. After 1929, the company had had its cash balances considerably augmented by reduction of accounts receivable and inventory; and although it had retired approximately $1,000,000 worth of 7% preferred stock with the cash so received, it still had in February, 1933, about $800,000 in cash and securities, primarily railroad bonds of low yield. (See Exhibit 1.) Company executives believed that in the future it would probably be better to have these funds invested in commodities rather than in bonds or lying idle in banks where they would draw no interest. In anticipation of an early upward turn in the business cycle and of a resulting moderate advance in hide and leather prices, the purchasing committee voted in March, 1933, the immediate purchase of enough staple kinds of leather to cover the company's requirements for shoe production until the end of the year. Thereafter prices advanced rapidly, and the leather used by the company cost it much less than would have been the case had it pursued a hand-to-mouth policy throughout 1933. Special kinds of leather required in highly styled shoes were purchased only as needed to fill orders already received.

Since the company's forward purchases of leather were for definitely scheduled production, with no intention of subsequent sale for a speculative profit, the company did not consider its forward buying in 1933 to have been speculation. The purchase had been arranged to protect the company against loss in the event of a price advance rather than to allow the company to make a greatly increased profit in 1933. Advances in the prices

EXHIBIT 1
COSTIGAN SHOE COMPANY
Balance Sheet, as of December 31, 1929–1935

	1929	1930	1931	1932	1933	1934	1935
Assets							
Plant, equipment, etc.	$ 164,094	$ 158,858	$ 202,159	$ 185,144	$ 119,905	$ 163,878	$ 149,908
Investments	10,398	3,652	3,290	3,292	5,006	3,292	3,052
Cash and time loans	790,014	190,232	150,400	170,152	157,318	155,460	252,535
Marketable securities	....	517,462	707,168	628,344	155,804	105,937	113,743
Accounts and notes receivable	1,996,828	1,781,862	1,017,215	838,794	1,405,763	1,125,110	1,340,297
Inventory	990,904	853,249	966,553	699,421	948,282	1,211,623	1,537,512
Deferred charges	64,812	51,834	56,809	30,382	28,540	55,914	41,292
Total	$4,017,050	$3,557,149	$3,103,594	$2,555,529	$2,820,618	$2,821,214	$3,438,339
Liabilities							
Preferred stock	$1,039,900	$ 731,400	$ 375,100	$ 97,400			
Common stock	1,352,400	1,352,400	1,352,400	1,352,400	$1,352,400	$1,352,400	$1,352,400
Notes payable	1,200	1,200	180,000	65,000	125,000	125,000	500,000
Accounts payable	22,430	72,238	80,130	26,065	61,343	86,138	105,195
Accruals	65,706	57,192	46,769	17,941	47,381	75,393	112,304
Reserve for taxes and dividends	176,946	149,532	82,123	....	36,408	23,321	48,040
Other reserves	480,349	266,712	121,158	71,696	140,285	93,451	105,098
Surplus	878,119	926,475	865,914	925,027	1,057,801	1,065,511	1,215,302
Total	$4,017,050	$3,557,149	$3,103,594	$2,555,529	$2,820,618	$2,821,214	$3,438,339
Current assets	$3,777,746	$3,342,805	$2,841,336	$2,336,711	$2,667,167	$2,598,130	$3,244,087
Current liabilities	266,282	280,162	389,022	109,006	270,132	309,852	765,539
Working capital	3,511,464	3,062,643	2,452,314	2,227,705	2,397,035	2,288,278	2,478,548

of shoes customarily lagged behind advances in hide and leather prices because intense competition forced shoe manufacturers to postpone advances in the prices of their finished products until stocks of raw materials were exhausted. Those companies which failed to anticipate raw material price advances and to accumulate substantial inventories of hides and leathers were forced to absorb heavy losses in the periods immediately following the beginning of an advance in hide and leather prices.

The success of the company's forward buying venture in 1933 encouraged it to continue the policy whenever the purchasing committee believed that price advances were likely. On no occasion, however, did the company purchase more than enough leather to cover its budgeted requirements for the ensuing production season, that is, for six or seven months. The company attempted, so far as possible, to make forward purchases during the dull periods between production seasons, either in July and August or in February and March. The policy of purchasing ahead only the kinds of leather called for by the production budgets was maintained, and the company did not at any time purchase leathers for resale. Between 1933 and 1936 the company did not resume its hand-to-mouth buying policy.

When the purchasing committee believed that prices were about to weaken, stocks of leather were allowed to decline to as low as two or three months' supply. The company made no attempts, however, during periods of falling prices, to hedge its physical inventories by sale of futures on Commodity Exchange, Inc. The purchasing executives of the company believed that hedging by this method was impracticable for several reasons. In the first place, they considered that hide trading on the commodity exchange was controlled by large tanners, who could artificially influence prices by withdrawing temporarily from the hide market or by putting large lots of tanned leather up for sale. Furthermore, hide and leather prices were not closely correlated, and a rise or fall in the price of hides did not necessarily mean a corresponding change in the price of leather.

By 1935 the belief on the part of company executives that substantial sums should be maintained as investment in raw material inventories had become so pronounced that, lacking surplus funds of its own, the company borrowed heavily from note brokers in order to maintain inventories at desired levels.

In May, 1936, prior to the beginning of shoe production for the spring, 1937, selling season, the company, in conformity with its policy of maintaining substantial inventories, had on hand nearly 450,000 pairs of outsoles, or approximately six months' supply. (See Exhibit 2.) It also had on hand more than 500,000 square feet of upper leather, or between three and four months' supply.

EXHIBIT 2
COSTIGAN SHOE COMPANY
Outsoles in Sight, May 20, 1936
(In pairs)

Grade	In racks*	Bag stock†	Uncut stock‡	On order	Total in sight	Expected requirements, May 20–Dec. 21, 1936
10F	8,000	13,380	4,260	0	25,640	40,596
9F	4,600	7,980	2,840	2,540	17,960	35,762
8½F	3,900	9,300	800	0	14,000	6,365
8F	2,000	11,080	420	0	13,500	32,482
7½F	1,700	0	130	0	1,830	7,494
10 #1	10,000	77,300	3,200	27,860	118,360	136,146
9 #1	8,100	8,580	3,320	97,360	117,360	163,904
8½ #1	5,700	43,600	1,240	41,400	91,940	86,330
8 #1	7,200	14,160	520	6,260	28,140	19,808
7½ #1	2,400	6,300	220	0	8,920	11,720
Total	53,600	191,680	16,950	175,420	437,650	540,607

* Cut soles, unpacked from bags and piled in racks.
† Cut soles, still in bags. One bag equals 10 cases or 600 pairs.
‡ Leather, not yet cut into soles.

When the budget of expected leather requirements was prepared in May, 1936, therefore, it was apparent that the stocks of sole leather on hand were nearly sufficient to meet the season's requirements and that the company, unless it changed its policy of purchasing only leather required in the ensuing season, would not be in the market for a great deal of sole leather between May and December. Substantial purchases of upper leather could be made, however, without departure from this policy.

When the purchasing committee met to discuss its leather buying policies for the remainder of 1936, Mr. Reynolds declared to the other members of the purchasing committee that he did not expect the sole-leather market to move upward at least until the fall. This belief, he said, was based on examination of all available statistics and on conversations with tanners' representatives. He stated that, while there was a shortage of that age of cattle which best supplied the heavy high-quality sole leathers used by the Costigan Shoe Company and while there was a tendency on the part of German and French buyers to purchase large quantities of South American sole leather to replenish their stocks against the possibility of war, the bullish influence of these factors on prices was neutralized by the usual full-season withdrawal of American manufacturers from the sole-leather market.

Mr. Reynolds pointed out that, but for one exception, it was not desirable for the company to plan to add to its stocks of sole leathers, at least until September. The exception was with reference to No. 1 grade, 9-iron sole,[1] the price of which seemed to have temporarily weakened as a result of overstocking by tanners and subsequent pressure to market these stocks. This type of sole was currently priced in the market at 37 cents a pair. A tanner from whom the Costigan Shoe Company customarily purchased this grade of sole had quoted a price of 35½ cents a pair, or 1½ cents below the existing market price. Mr. Reynolds believed that this offer resulted from a purely temporary glut and that it would be withdrawn before active trading in sole leather began again in the fall. He recommended that the company purchase 60,000 pairs of soles of this type immediately in order to take advantage of the temporary price concession. Such a purchase would bring the company's sole-leather inventory to a point in excess of 90% of requirements for the next seven months. The other members of the purchasing committee agreed with Mr. Reynolds that this was a wise move and authorized the immediate purchase of this quantity, to be delivered in equal installments in July, August, and September. (See Exhibit 3.)

The buyer of upper leather reported to the purchasing committee that the price structure in the upper-leather market was somewhat stronger than in the sole-leather market and that the customary between-season weakness had not developed. His impressions of the price structure were based on personal visits to the hide and leather market and on conversations with representatives of tanners and shoe manufacturers. He did not follow current statistics closely since he did not believe that they reflected actual conditions well enough to justify dependence upon them,

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[1] An iron equals 1/48 inch of thickness.

EXHIBIT 3
COSTIGAN SHOE COMPANY
Outsole Requirements and Ordering Plan
May 20–December 31, 1936
(In pairs)

	Fine grade					#1 grade				
	10	9	8½	8	7½	10	9	8½	8	7½
In sight 5/20	25,640	17,960	14,000	13,500	1,830	118,360	117,360	91,940	28,140	8,920
Use 5/20–5/31	2,520	2,720	270	350	270	3,060	12,150	9,310	5,060	1,130
Bal. 6/1	23,120	15,240	13,730	13,150	1,560	115,300	105,210	82,630	23,080	7,790
Use June	3,965	3,084	586	1,247	193	7,064	10,107	7,253	275	475
Bal. 7/1	19,155	12,156	13,144	11,903	1,367	108,236	95,103	75,377	22,805	7,315
Use July	8,266	8,038	982	7,015	573	29,162	36,090	21,556	623	914
Bal. 8/1	10,889	4,118	12,162	4,888	794	79,074	59,013	53,821	22,182	6,401
Use Aug	4,325	3,240	844	6,569	1,305	25,216	20,160	18,715	658	605
Bal. 9/1	6,564	878	11,318	1,681*	511*	53,858	38,853	35,106	21,524	5,796
Use Sept	5,368	3,797	282	4,623	675	16,997	20,591	9,114	815	802
Bal. 10/1	1,196	2,919*	11,036	6,304*	1,186*	36,861	18,262	25,992	20,709	4,994
Use Oct	7,070	6,633	1,556	7,354	1,810	30,051	28,551	9,747	1,472	1,816
Bal. 11/1	5,874*	9,552*	9,480	13,658*	2,996*	6,810	10,289*	16,245	19,237	3,178
Use Nov	4,874	4,788	1,174	3,817	1,208	21,222	24,922	6,691	6,359	4,192
Bal. 12/1	10,748*	14,340*	8,306	17,475*	4,204*	14,412*	35,211*	9,554	12,878	1,014*
Use Dec	4,208	3,462	671	1,507	1,460	3,374	11,333	3,944	4,546	1,786
Bal. 1/1/37	14,956*	17,802*	7,635	18,982*	5,664*	17,786*	46,544*	5,610	8,332	2,800*

Order plan

Buy immediately	60,000
For delivery in:	
July	20,000
August	20,000
September	20,000

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* Deficiency.

preferring to base his recommendations on what he termed hunches. It was his opinion that the refusal of prices to drop during the dull season, which had already commenced, would continue, and that in all probability there would be an actual increase in prices prior to the resumption of large-scale purchasing in the fall. He recommended that the company immediately purchase 350,000 square feet of various kinds of upper leathers and thus increase its inventories of upper leather to approximately 900,000 square feet. If this was done, approximately 80% of the company's upper-leather requirements until the end

EXHIBIT 4
COSTIGAN SHOE COMPANY
Upper-Leather Requirements Based on Sales Estimates
May 12–December 31, 1936
(In square feet)

Kind of leather	Expected requirements 5/12–12/31/36	On hand or on order 5/12/36	Required to purchase 5/12–12/31/36	Recommended immediate purchases
Black Russia	453,720	207,951	245,769	180,000†
Color 79 Russia	138,252	52,236	86,016	36,000†
Imported box calf	116,310	61,521	54,789	36,000†
Color 144 homespun	43,230	30,900	12,330	10,800†
Color 55 Russia	42,066	21,150	20,916	15,000†
Black tweed grain	42,030	24,237	17,793	15,000†
Brown shaggy*	40,680	12,936	27,744	22,500†
Black kid	30,720	15,450	15,270	...†
Gray shaggy*	28,500	11,100	17,400	12,000†
Black kangaroo	19,740	8,850	10,890	8,400
Color 88 Shetland	17,574	9,510	8,064	3,600
Brown tweed grain	13,890	5,250	8,640	8,400
Sand shaggy*	12,840	6,510	6,330	3,600
Patent colt	12,300	6,300	6,000	Order as needed to cover orders received
Tan Norse veal	12,210	10,530	1,680	
Black grain #2	11,610	8,250	3,360	" "
Color 74 Russia	10,260	3,837	6,423	" "
Color 6 cretan	10,059	4,941	5,118	" "
Brown grain #6	9,780	4,899	4,881	" "
Black skoki	7,470	6,240	1,230	" "
Color 88 tweed grain	6,840	3,480	3,360	" "
Chocolate Scotch grain	6,750	4,530	2,220	" "
Black Rugby grain	6,390	4,236	2,154	" "
Blue shaggy*	5,670	1,251	4,419	" "
White elk	5,370	7,110	....	" "
Brown bucko*	5,130	2,820	2,310	" "
440 alligator*	4,200	636	3,564	" "
Brown kid	3,255	1,551	1,704	" "
Color 110 veal	2,640	561	2,079	" "
Color 88 Shetland	2,454	1,842	612	" "
Color 29 Eskimo	1,818	1,536	282	" "
Fawn bucko*	1,788	318	1,470	" "
Brown kiltie grain	1,518	981	537	" "
Brown Cordovan	1,095	912	183	" "
Black Norwegian	1,095	891	204	" "
Black kiltie grain	858	840	18	" "
Total	1,130,112	546,093	585,759	351,300

* For high-style, nonstaple numbers.
† See Exhibit 5.

EXHIBIT 5

COSTIGAN SHOE COMPANY

Upper-Leather Requirements and Order Plan Details for Selected Kinds

May 12–December 31, 1936
(In square feet)

	Black Russia	Color 79 Russia	Imported box calf	Color 144 homespun†	Color 55 Russia	Black tweed grain†	Brown shaggy	Black kid	Gray shaggy	Total
In sight 5/12/36	207,951	52,236	61,521	30,900	21,150	24,237	12,936	15,450	11,100	437,481
Use 5/12–5/31	48,900	12,900	10,800	8,100	3,600	7,800	6,600	2,400	3,000	
Balance 6/1	159,051	39,336	50,721	22,800	17,550	16,437	6,336	13,050	8,100	
Use June	55,410	15,300	13,800	11,100	6,600	10,800	9,600	3,600	6,000	
Balance 7/1	103,641	24,036	36,921	11,700	10,950	5,637	3,264*	9,450	2,100	
Use July	67,500	20,400	16,200	14,400	7,800	14,100	9,600	4,200	6,300	
Balance 8/1	36,141	3,636	20,721	2,700*	3,150	8,463*	12,864*	5,250	4,200*	
Use August	88,200	18,900	16,800	7,200	8,400	6,900	5,100	4,500	5,400	
Balance 9/1	52,059*	15,264*	3,921	9,900*	5,250*	15,363*	17,964*	750	9,600*	
Use September	72,600	20,100	14,400	2,400	4,800	2,400	4,200	4,500	3,900	
Balance 10/1	124,659*	35,364*	10,479*	12,300*	10,050*	17,763*	22,164*	3,750*	13,500*	
Use October	46,200	18,300	14,100	0	4,200	0	2,400	4,200	2,100	
Balance 11/1	170,859*	53,664*	24,579*	0	14,250*	0	24,564*	7,950*	15,600*	
Use November	38,100	17,100	13,800	0	4,200	0	1,800	4,200	1,500	
Balance 12/1	208,959*	70,764*	38,379*	0	18,450*	0	26,364*	12,150*	17,100*	
Use December	36,900	15,000	16,200	0	2,400	0	1,200	3,000	900	
Balance 1/1/37	245,859*	85,764*	54,579*	0	20,850*	0	27,564*	15,150*	18,000*	497,829*

Order plan

Buy immediately	180,000	36,000	36,000	10,800	15,000	15,000	22,500	......	12,000	327,300
For delivery in:										
May	......	......	......	10,800	......	......	7,500	......	......	18,300
June	......	......	......	......	......	7,500	7,500	......	6,000	21,000
July	60,000	18,000	......	......	7,500	7,500	7,500	......	6,000	106,500
August	60,000	18,000	......	......	7,500	......	......	......	......	85,500
September	60,000	......	36,000	......	......	......	......	......	......	96,000

* Deficiency.
† Winter shoe leather only—not used after September.

of the year would be covered. Mr. Reynolds and the president believed with the upper-leather buyer that no price weakness in upper leathers was probable and that it was wise to increase stocks in anticipation of price advances. They, therefore, voted to purchase upper leathers in the recommended quantities. (See Exhibits 4 and 5.)

The carrying out of these recommendations would result in increasing the sole-leather and upper-leather inventories from approximately $350,000 to approximately $500,000. The company's bank loans in May, 1936, had been reduced to about $300,000 from the December, 1935, level of $500,000. The financial budget of the company indicated that they would be reduced to approximately $100,000 by July, when the bulk of deliveries on the new purchases would begin. The company would have no difficulty in borrowing at a rate of 1¼% such funds as were needed to pay for the new inventory as it was delivered. Mr. Reynolds, the comptroller, reported that he was constantly besieged by note brokers seeking to lend the company money and that the company could borrow substantially in excess of $500,000 if it desired to do so.

76. COSTIGAN SHOE COMPANY (B)

INFLUENCE OF MARKETING CONSIDERATIONS ON PURCHASING POLICIES

A meeting of the purchasing committee of the Costigan Shoe Company was called in October, 1936, to determine what course should be followed in acquiring the leather needed for manufacturing in the first six months of 1937. At this meeting the comptroller recommended that the company should immediately place orders to cover its entire production requirements for the period.

Production schedules by styles for the first half of 1937 had already been prepared and approved by executive committees of the company. From these schedules, estimates of upper and sole-leather requirements by types and grades had been made. The purchasing committee, therefore, knew approximately what quantities of raw materials would have to be purchased to cover production needs in the first half of 1937 and at what times these raw materials would have to be available.

All the shoes manufactured by the Costigan company were sold directly by company salesmen to independent retailers, either under the Costigan brand name or in slightly modified styles under the individual retailer's private brand name. The company manufactured approximately 200 styles, which were sold in one or more of the following retail price lines: $5, $7, $7.50, $8.50, and $10. More shoes were sold to retail at $7 than at any other price; the $5 line was next in importance. These two lines accounted for more than 65% of the company's total sales.

Estimates of cost had been made for each style scheduled for production in the first half of 1937. These costs were based on current raw material and labor prices. There was a substantial cost spread among the styles in any one price line. Thus the total cost per pair for the various styles listed for production in the first half of 1937 in the $5 price line varied from $2.80 to $3.15. Exhibit 1 contains a cost estimate of a typical item in this line as of October 1, 1936.

The company expected each price line to show about the same percentage of profit but did not expect individual styles within each line to do so. All the shoes in each price line, regardless of cost, were sold to retailers at the same price. Thus retailers obtained the same markup percentage on each pair of shoes in a given price line. The usual markup allowed to dealers on the $5 line was 37%; that is, the company endeavored to sell all styles in this line to dealers at a price of $3.15 a pair.

On several occasions in the past, however, when, because of rises in raw material prices or labor costs, actual costs of manufacture exceeded the company's pre-season estimates, the company had found it necessary to charge more than $3.15 a pair for the styles in the $5 line. At such times corresponding price increases also had been made in the other four price lines.

EXHIBIT 1
COSTIGAN SHOE COMPANY
Cost Estimate of Typical Item in $5 Line as of October 1, 1936

Item	Cost per pair
Upper stock	$0.593
Linings and trimmings	0.161
Bottom stock	0.535
Findings (lace, eyelets, etc.)	0.087
Labor	0.556
Manufacturing constant*	0.512
Total factory cost	$2.444
Commission	0.126
Selling constant	0.277
Discount	0.016
Profit	0.287
Selling price	$3.150

* Including shoe cartons, packing cases, factory overhead.

When such advances in the company's prices had occurred, retailers in general, instead of maintaining their price lines and thus lowering their markup percentages, immediately passed the increases along to their customers by raising the retail prices of the shoes. Since experience had shown that prices not expressed in even dollars or half dollars a pair were not attractive to their customers, retailers usually advanced their prices 50 cents a pair at a time. Thus when the Costigan company's prices were increased to a point anywhere between $3.15 and $3.46 a pair, most of the retailers priced the shoes in this line at $5.50 a pair. In such instances the actual percentage markup obtained by dealers was greater than the intended markup of 37%, until by successive increases, the Costigan Shoe Company's price reached a level of $3.46 a pair. It had been the practice of the Costigan Shoe Company during periods of advancing prices to give its dealers the benefit of increased markup percentages by advancing its prices only as costs advanced rather than by raising its prices in one jump from $3.15 to $3.46 a pair.

The Costigan Shoe Company believed that the first shoe manufacturer to raise prices lost a substantial portion of his physical volume to competitors who did not advance prices. This was particularly true of the $5 line. The comptroller believed that, if because of increasing costs the Costigan company was forced to advance its prices in the $5 line before competitors made similar advances, as much as 25% or 35% of the company's physical volume might be lost. Competition at the $5 level was much more severe than for the higher-price shoes sold by the company. Customers paying $7 a pair or more seldom were disturbed by a price advance of 50 cents a pair and did not shop around to discover whether they could do better elsewhere, as did customers paying $5 a pair or less.

In the opinion of the comptroller, the loss of business by companies initiating price advances did not usually result from loss of dealers but rather from loss of customers' patronage by retailers who continued to sell the line. Because of their large inventory investments, most dealers were of necessity loyal to the companies whose lines they were selling. It was seldom advisable for retailers to shift from one shoe manufacturer to another because of temporary differences in price levels of their lines. Companies making a practice of being among the first to advance prices, however, gradually built up ill will among their dealers and over a period of years lost many of them.

In order to minimize the danger of antagonizing dealers, the Costigan Shoe Company ordinarily tried to give them advance notice of expected price rises in order to allow them to replenish their stocks prior to the effective date of the increases in price. Company catalogues usually carried notices to the effect that orders received before a certain date would be accepted at quoted prices, but that thereafter prices would be subject to change without notice. The company could not afford to give such advance notice, however, unless it had on hand substantial quantities of shoes manufactured from raw materials purchased at low prices.

Some of the Costigan Shoe Company's competitors preferred to maintain their $5 price line during periods of increasing costs by lowering the quality of their product. The Costigan Shoe Company, however, did not indulge in this practice because its executives believed that a few cents taken off the cost meant a substantial reduction in wearing quality. Company officials believed that retailers and customers soon became aware of the fact that the quality had been lowered and transferred their patronage to brands of constant quality, even though these brands were selling at prices above $5.

It was, therefore, eminently desirable for the Costigan Shoe Company to be one of the last shoe manufacturers to raise its prices during periods of general advance. In the past, as a matter of policy, the Costigan Shoe Company had given up some of its planned profit margin, especially on the $5 line, in order to delay announcement of price advances. The company was, however, unwilling to allow its profit margins to be entirely wiped out and generally advanced its prices before this event occurred.

The Costigan Shoe Company planned to send out to dealers in January, 1937, about 10,000 catalogues containing descriptions and prices of all the styles which it was planning to manufacture in the first half of the year for sale during the second half. It was expected that the catalogue would contain the usual notice that prices would be as quoted on orders received before April 1 and thereafter would be subject to change without notice. Although most of the company's retailers generally followed a hand-to-mouth purchasing policy, those who did order well in advance of the selling season could protect themselves against possible price increases. Receipt of advance orders allowed the company to appraise more efficiently the appeal of its new styles and to make any desirable changes in its production schedules. Unless the company had on hand sufficient raw material or finished stock purchased at favorable prices, however, profit margins on these advance orders would have to be reduced.

The company planned to send salesmen into the field after April 1 to solicit orders from its retailers. If the leather market had advanced since October, 1936, the prices quoted by these salesmen would probably be higher than those quoted in the catalogue. The higher prices would, of course, meet with considerable resistance from company salesmen and those retailers who had not covered their requirements in advance. On the other hand, if the price of leather went down, retailers would expect immediate reductions in the price of the company's shoes.

When it was necessary to advance prices, those retailers who had ordered early would be able to delay increasing their retail prices, while those who had to replenish inventories at higher costs would probably pass the increase on to their customers. The same styles would therefore be sold at different prices at the same time.

The comptroller believed that the spring of 1937 would be a period of substantial recovery in business. Although the statistics before him gave no indication that an advance in leather prices was beginning, it was his belief that leather would participate in the general commodity price advances which he expected to occur in the near future as a result of better business and improvement in sentiment.

The comptroller suspected that a number of the company's competitors were buying leather ahead, some of them as much as a year in advance. He therefore recommended to the purchasing committee that the company should immediately cover its requirements for the first half of 1937 in order to insure normal profits for the company in the event of an advance and to allow the company to defer such price increases as might become necessary until after most of its competitors had advanced their prices.

77. REYNOLDS RUBBER COMPANY (A)

SPECULATIVE PURCHASING OF COTTON FUTURES

The Reynolds Rubber Company manufactured tires of all grades. Its tires were distributed nationally, largely through independent outlets. The company owned and operated cord mills in the South and tire plants in the north central states and on the West Coast.

The company used both raw cotton and cotton fabric in the manufacture of its tires. About 70% of the cotton content of its product was purchased in the raw state for use in making cords, while the remaining 30% was purchased in fabric form. The total raw cotton content of all materials used in tire production by the company was approximately 100,000 bales in 1932, 115,000 bales in 1933, and 135,000 bales in 1934.

Exhibit 1
Monthly Average Prices
Middling Upland Spot Cotton at New York, 1929–1934
(In cents per pound)

Month	1929	1930	1931	1932	1933	1934
January	20.23	17.22	10.28	6.65	6.24	11.25
February	20.22	15.62	10.96	6.85	6.05	12.28
March	21.19	15.18	10.91	6.85	6.39	12.30
April	20.33	16.42	10.19	6.17	7.02	11.80
May	19.53	16.43	9.38	5.73	8.65	11.44
June	18.72	14.47	9.05	5.27	9.47	12.20
July	18.62	13.11	9.28	5.88	10.74	12.85
August	18 64	12.03	7.22	7.44	9.56	13.40
September	18 85	10.96	6.50	7.68	9.64	13.00
October	18 46	10.62	6.32	6.57	9.59	12.48
November	17.53	10.94	6.44	6.22	10.04	12 54
December	17.27	10.01	6.24	5.95	10.17	12.76

Source: *New York Cotton Exchange Service.*

In June, 1932, the price of cotton reached the lowest level in many years. (See Exhibit 1.) At this time the Reynolds Rubber Company was operating on the minimum inventories necessary to insure continuity of production. These minima were as follows:

Raw Cotton Equivalent on Hand

	Weeks
In raw material inventory	6
In cord mill processing	2
In cord inventory	3
In tire processing	1
In tire inventory	8
Total raw cotton equivalent on hand	20

The availability of some of the grades and staples of raw cotton used by the company was uncertain. To protect itself against possible shortages, therefore, the company carried approximately three months' supply of such items. Only about four weeks' supply of the more common grades and staples was carried. The six weeks' average minimum inventory included cotton equivalent in storage at points of purchase, in transit to the mills, and in storage at the mills.

The policy of carrying a minimum inventory had been adhered to since the beginning of the depression, during which prices of tires, cotton, and rubber declined to lower and lower levels. Although the company had reduced its physical inventories of cotton to the lowest practicable minima, it had never hedged them by selling futures. The failure to hedge physical inventories was partly because the management of the company was unfamiliar with the nature and operations of the cotton exchange and partly because there was a general objection to speculation in commodities.

In June, 1932, the director of purchasing believed that in the near future the price of cotton would rally substantially from its recent low level. He, therefore, recommended to the purchasing committee that the company take a long position in raw cotton by buying futures on the New York Cotton Exchange. The purchasing committee was composed of (1) the vice president in charge of finance, (2) the comptroller, (3) a vice president with past experience in production, (4) the head of the commercial research department, and (5) the director of purchasing. Whereas the first three members of this committee had a general knowledge of commodities, the last two were thoroughly familiar with such materials and devoted much of their time to the study of production, consumption, and price trends.

The recommendation of the director of purchasing specifically provided for the purchase of cotton futures in amounts up to two years' requirements, or approximately 200,000 bales at the then current rate of consumption, at a price of 7 cents a pound or less. He advocated that a steady accumulation begin immediately at the rate of about 2,000 bales a day in order to avoid unduly influencing the market. In his recommendation the director of purchasing did not attempt to limit the period of time for which futures were to be owned. The length of this period was to be determined later in the light of subsequent events.

There were several reasons why the director of purchasing recommended buying futures rather than spot cotton: (1) The company did not want delivery when its futures matured as the cotton tendered would not be of the correct staple; instead, it purchased its requirements of cotton in the Memphis spot market, the largest interior spot cotton market in the United States. (2) The company had warehouse space available for the storage of only about 20,000 bales. Purchases of spot cotton in larger amounts for speculative purposes would necessitate the company's bearing an additional warehousing expense. (3) The purchase of spot cotton would require cash payments; and, since the company's financial position was not entirely satisfactory (see Exhibits 2 and 3), it might have proved difficult for the company to borrow money to finance such transactions. The interest rate on any loans that the company might have obtained would probably have been 6% even though the cotton were put up as collateral for the loans.

On the other hand, the Reynolds Rubber Company could purchase futures entirely on credit, since the rules of the New York Cotton Exchange allowed brokers to extend credit at their option in amounts not exceeding $10,000, or $5 a bale, to each of their clients. If the company obtained the full amount of credit possible under this provision, it would be able to purchase 2,000 bales through each broker with whom it dealt. The company could purchase an additional 2,000 bales from each broker through one of its subsidiaries. No money would have to be advanced on these contracts unless the losses on cotton so purchased exceeded the allowed limit of $5 a bale or 1 cent a pound. By spreading its purchases among a large number of brokers, the company could purchase entirely on credit all the cotton desired. The director of purchasing had obtained this information by addressing inquiries among a number of brokers, all of whom were willing to extend to the company the maximum credit allowed by the rules of the cotton exchange.

The recommendation of the director of purchasing provided that each futures purchase be identified with a spot purchase. According to this plan, whenever spot cotton was purchased for manufacturing purposes, a corresponding amount of futures held by the company would be sold, and the profit or loss on the futures transaction would be applied against the cost of the spot cotton. The futures then might be replaced or not as seemed advisable.

EXHIBIT 2
REYNOLDS RUBBER COMPANY
Comparative Balance Sheet as of December 31, 1929–1934
(In thousands of dollars)

	1929	1930	1931	1932	1933	1934
Assets						
Current assets:						
Cash	6,299	4,732	6,314	8,829	7,615	9,146
Notes and accounts receivable	31,313	23,445	21,000	19,555	21,148	22,715
Inventory (lower of cost or market)	39,956	33,760	24,436	17,542	23,461	27,682
Total current assets	77,568	61,937	51,750	45,926	52,224	59,543
Prepaid and deferred assets	2,561	2,490	2,668	2,403	2,588	2,162
Property, plants, and equipment	92,514	89,116	85,918	85,620	78,400	75,208
Total assets	172,643	153,543	140,336	133,949	133,212	136,913
Liabilities						
Current liabilities:						
Notes and accounts payable	28,861	15,828	9,392	11,984	12,378	13,138
Accruals	2,471	2,634	2,519	2,361	2,790	2,845
Total current liabilities	31,332	18,462	11,911	14,345	15,168	15,983
Funded debt	40,551	40,311	39,742	35,069	31,332	29,911
Reserves	10,222	9,649	4,121	2,619	3,086	4,765
Common stock and surplus	90,538	85,121	84,562	81,916	83,626	86,254
Total liabilities	172,643	153,543	140,336	133,949	133,212	136,913

EXHIBIT 3
REYNOLDS RUBBER COMPANY
Comparative Income Statement for Years Ended December 31, 1929–1934
(In thousands of dollars)

	1929	1930	1931	1932	1933	1934
Net sales	163,547	135,613	103,567	75,962	91,332	108,622
Cost of manufacture	139,910	120,415	90,799	67,393	76,602	93,882
Operating income	23,637	15,198	12,768	8,569	14,730	14,740
Deductions:						
Depreciation, taxes, interest	9,564	11,416	13,285	11,345	11,469	10,119
Inventory adjustment	2,386	10,543	2,946	1,653		
Net income	11,687	6,761[d]	3,463[d]	4,429[d]	3,261	4,621

[d] Deficit.

In charging materials to the various manufacturing divisions, the Reynolds Rubber Company debited their accounts with the standard costs of materials used, later crediting them with the standard costs of goods finished. The manufacturing divisions were also debited or credited with variations between the standard costs and the prices actually paid for the materials issued to them. Standard costs were determined each fall for the succeeding year. The price structure of the finished tubes and tires was based on these standard costs, subject to modification because of competition.

All the manufacturing divisions operated on production budget schedules that were drawn up in the company's central offices. Executives in the manufacturing divisions followed these production budget schedules when requisitioning raw materials and supplies. No variation in a schedule was allowed unless authorized by executives in the central office.

Manufacturing divisions reported their inventories and turnover rates monthly to the director of purchasing, who was responsible for all inventory control. Also under his jurisdiction was an office in Memphis, through which the company purchased all its requirements of spot cotton in the proper grades and staples. The director of purchasing was in close contact with this office and exchanged opinions with its manager as to probable trends of cotton prices. Actual decisions as to cotton purchases, however, were made entirely by the director of purchasing, who decided when and how much to buy and the terms of purchase. The company purchased spot cotton both under the call system and by fixed price contracts. The Memphis office sampled and inspected all cotton purchased. If the grades required were difficult or impossible to obtain, it was sometimes necessary to purchase and blend several grades.

The purchasing committee of the Reynolds Rubber Company accepted the recommendation and plans made in June, 1932, by the director of purchasing for the acquisition of cotton futures. It was unwilling, however, to give him a blanket authorization to purchase futures up to an amount equal to a two years' forward supply. Instead it decided to meet weekly to determine how much should be purchased.

Subsequently, successive authorizations to purchase futures were granted to the director of purchasing as follows: 15,000 bales at 6 cents a pound or less; 20,000 at 6½ cents or less; and 28,500 at 7 cents or less. By the middle of December, 1932, the director of purchasing had acquired for the company the entire authorization of 63,500 bales. The company's holdings of futures were evenly distributed throughout all the futures months being traded in currently on the New York Cotton Exchange. This policy of distributing the company's holdings of futures contracts evenly throughout all available months was adopted by the director of purchasing in order to keep the magnitude of operations from influencing the market unduly when the contracts were purchased or when they were sold or replaced at maturity.

The prices at which the company had purchased the futures held in the middle of December, 1932, converted to the basis of the January, 1933, futures contract[1] gave an average price of 6.866 cents a pound. This did not include taxes or brokers' commissions on purchases which were payable when the contracts were sold or delivery was accepted. Commissions were $30 and taxes were $5 for the round turn purchase and sale of each futures contract. Each contract represented 100 bales of 500 pounds each.

The purchasing committee did not authorize any addition to the total of its futures holdings after the middle of December, 1932. As futures matured, however, they were replaced, and the company's holdings remained unchanged at 63,500 bales during the first half of 1933. The price of cotton rose substantially during this period. (See Exhibit 1.) This rise in price was contributed to by the devaluation of the dollar and the government's announcement of a cotton restriction program.

On June 27, 1933, the average cost of cotton futures held by the company, based on the October, 1933, futures, was 7.29 cents a pound. On this date, at the recommendation of the director of purchasing, the purchasing committee authorized him to sell, at his discretion, up to 20,000 bales of the cotton futures at 11 cents a pound or better. Although the price of the October futures rose above 11 cents a pound temporarily in July, 1933, the director of purchasing did not sell any of the company's holdings at that time. From then until the close of 1933, the price did not again exceed 11 cents a pound; therefore, none of the futures were sold during the remainder of the year.

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[1] Conversion to the basis of the January, 1933, futures was accomplished by subtracting, from the purchase price of each futures contract held, the current differential between it and the January, 1933, contract.

In the period from June, 1932, through December, 1933, two modifications were made in the original proposal of the director of purchasing. In the first place, the original report recommended that the company confine its forward purchasing of cotton to the futures market and continue to carry minimum physical inventories. Before July, 1933, however, the company had increased its physical inventory of cotton in the raw state and in process from 12 weeks' supply to 4½ to 6 months' supply. Before the end of 1933, the company had reverted to its former policy; and at the close of 1933 stocks of raw and process cotton were again reduced to about 12 weeks' supply. The return to the policy of carrying minimum inventories was suggested by the director of purchasing in order to avoid any inventory losses which might ensue as a result of governmental activities through the National Recovery Administration and the Agricultural Adjustment Administration.

The second change from the original proposal was in the handling of profits accruing on purchases of futures. The original proposal provided that each futures contract be identified with a spot purchase. Futures were to be sold in amounts equal to spot purchases at the time of such spot purchases, and the profits on these futures were to be credited to the purchase price of the spot cotton. This program was never carried through, however. Instead, spot cotton purchased was debited to the manufacturing divisions at purchase prices, and profits accruing when futures matured were transferred directly to the general profit and loss account.

In January, 1934, the price of cotton again rose above 11 cents a pound. The company thereupon began to sell its holdings of futures. Successive authorizations to sell were made by the purchasing committee during the year. By the close of the year, all futures held by the company had been disposed of at an average of 12.17 cents a pound. To keep competitors and the general public from learning of the company's operations, the disposition of these futures was carried on in an orderly fashion. The total profit on the company's transactions in cotton futures between June, 1932, and December, 1934, was 4.35 cents a pound, after deduction of commissions, taxes, and other expenses. This amounted to $21.75 a bale on 63,500 bales, or substantially more than $1,000,000.

During the period, the company used approximately 20 brokers and operated entirely on the credit. The company drew down some of its profit as the price of cotton increased, even before the futures matured. Another part of the profit was taken down as futures matured and were replaced, and the remainder when futures were finally disposed of. All profit went directly into the company's treasury.

During 1934 the purchasing committee decided to withdraw the company from its long position on cotton futures for a number of reasons: (1) Substantial profits had been made. (2) The director of purchasing and the members of the purchasing committee believed that most of the factors causing increases in cotton prices during 1932, 1933, and early 1934 had been pretty well discounted. These factors included the devaluation of the dollar, the crop reduction programs, and the pegging of prices by government loans. (3) The executives believed that the uncertainty resulting from continual government interference with the orderly working of the laws of supply and demand made it impossible to forecast future prices on the basis of known statistical facts.

78. REYNOLDS RUBBER COMPANY (B)

FORWARD PURCHASING OF CRUDE RUBBER

The Reynolds Rubber Company used from 150,000,000 to 250,000,000 pounds of rubber annually in the manufacture of tires. Each year approximately 50,000,000 pounds of rubber were grown by the company on its own plantations. This rubber was mostly of premium grades. About 20,000,000 pounds of it were of higher quality than that required by the company; this quality was sold to outside users. The company's needs in excess of the remaining 30,000,000 pounds net were purchased from dealers located in New York City.

Exhibit 1
Crude Rubber Prices
Average of One Price Weekly, Plantation Ribbed, Smoked Sheets, Spot, at New York City, 1925–1934
(Cents per pound)

Month	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
January	36.4	79.6	39.3	40.0	20.1	15.1	8.3	4.4	3.1	9.2
February	35.6	62.1	38.2	31.6	24.2	15.8	7.8	4.1	3.0	10.5
March	41.3	58.4	41.0	26.9	24.6	15.3	7.7	3.3	3.0	11.1
April	44.5	50 9	40.9	19.9	21.5	14.8	6.3	3.1	3.6	12.0
May	57.1	48.1	40.8	18.9	21.8	14.1	6.6	3.1	4.9	13.5
June	77.1	43.1	37.0	19.3	20.6	12.5	6.4	2.7	6.2	13.5
July	104.2	41.3	35.0	19.2	21.2	11.4	6.3	2.9	8.0	14.6
August	80.8	38.0	35.1	19.2	20.7	9.9	5.4	3.7	7.3	15.5
September	89.3	41.3	33.8	18.3	20.4	8.3	5.0	3.9	7.3	15.5
October	99.6	42.7	34.4	18.7	19.8	8.2	4.9	3.5	7.7	14.0
November	104.8	39.9	37.9	18.2	16.7	9.0	4.6	3.4	8.6	13.0
December	100.0	38.2	41.0	17.9	16.1	8.9	4.6	3.2	8.8	13.0
Average	72.5	48.6	37.9	22.4	20.7	11.9	6.2	3.5	6.0	13.0

Source: Standard Trade and Securities, *Basic Statistics*, G25, quoting the *New York Journal of Commerce*.

The price of crude rubber declined from 104.8 cents a pound in November, 1925, to a new, all-time low of 2.7 cents a pound in June, 1932. The price declined steadily during these years except for a brief period in 1926–1927, when the Stevenson Restriction Plan temporarily halted the downward trend of prices. (See Exhibit 1.)

Throughout the seven-year period of declining prices, the Reynolds Rubber Company had operated on a hand-to-mouth basis, carrying only the minimum inventories necessary to insure continuity of operation. These minima were as follows:

Crude Rubber Equivalent on Hand

	Weeks
In raw material inventory	4
In tire processing	1
In tire inventory	8
Total crude rubber equivalent on hand	13

With the exception of 1927 and 1928, the four-week inventory of raw material was possible because stocks in dealers' hands in the United States were available in sufficient quantity to protect the company against a shortage during the period of 45 days required for shipment from the Far East to New York City. During 1927 and 1928, when stocks in dealers' hands represented less than two weeks' supply, the company had found it necessary to carry several weeks more than the minimum inventory of raw material. Subsequently, stocks in dealers' hands were more than sufficient to protect the company against a possible shortage of material during the period of shipment.

The Reynolds Rubber Company purchased all its crude rubber requirements through New York dealers. Payment was due 30 days after delivery. The prices quoted by the dealers covered all charges and their profits. The market prices of crude rubber were obtained by averaging these dealer quotations. Between 1925 and 1932, most of the company's purchases were of spot rubber for immediate delivery from stocks already in dealers' hands in New York City. During this period, except on the rare occasions when it could secure substantial price concessions for so doing, the company refused to purchase rubber for future delivery from stock in dealers' hands, in transit, or in Far Eastern ports awaiting shipment to New York.

On contracts specifying delivery from Far Eastern ports the price was fixed at the time of purchase, but delivery was allowed at any time from 45 to 105 days after arrangements for the purchase, the dealers selecting their own delivery date between these limits. The 45-day minimum represented the time necessary for actual shipment. The remaining 60 days were a period of grace allowed dealers before they were liable for nonperformance under the terms of their contracts. During periods of brisk demand for rubber, dealers customarily held back delivery for nearly the full period. Prior to 1925, the company had found it necessary on such occasions to maintain minimum inventories of from 4½ to 6 months' requirements of crude rubber. The alternative was the payment of a premium for spot or near-by deliveries and the assumption of the risks of inability to meet requirements even at the premium.

The price of 2.7 cents a pound quoted for rubber delivered in New York in June, 1932, meant a price in Far Eastern ports of 1.85 cents a pound and at plantations of 1.5 cents. The company knew from its own experience that 1.5 cents a pound at the plantations would not cover even the out-of-pocket costs of operating a foreign-owned plantation. The operating costs of the company's plantations, when running at capacity, were 7 cents a pound. Of this amount, about 4 cents represented fixed costs, such as interest on investment and depreciation, and 3 cents represented variable operating costs. The company's plantations were efficiently operated and, in the opinion of the directors, among the lowest-cost major producers in the world. As a result of the low prices of rubber in 1931 and 1932, many foreign-owned plantations were closed, some being allowed to revert back to jungle.

Although the out-of-pocket costs incurred in the operation of rubber plantations owned by European and American interests were 3 cents a pound and more, native producers had no such costs. Whereas administrators and labor had to be hired for the operation of foreign-owned rubber plantations, native producers could use their own labor and the labor of their families in the growing of the rubber, which in most instances was their only cash crop. After the original planting of trees, native rubber producers had no capital outlays, since they did not cultivate their holdings. When prices were falling, there was a tendency on the part of native producers to raise more rubber in order to maintain their annual dollar earnings. In 1932 native rubber represented approximately 55% of the total quantity produced as compared with approximately 35% in 1922. Therefore, although in 1932 the price of rubber had already fallen below the out-of-pocket price on foreign-owned plantations, it was entirely possible for native producers to operate at existing levels.

The director of purchases of the Reynolds Rubber Company believed, however, that in spite of the pressure of native production, prices could not indefinitely remain below the level of foreign-owned plantation costs. It was his opinion that prices would not go appreciably below the June, 1932, level of 2.7 cents a pound and that the long-trend outlook was for a substantial rise in prices to a point above the total costs of 7 cents a pound incurred by the company in growing rubber on its own plantations. In June, 1932, therefore, he recommended to the company's purchasing committee that the hand-to-mouth policy with reference to rubber inventories, which had prevailed since 1927, be reversed, and that a policy of accumulation be instituted. The purchasing committee accepted this proposal in principle. Its members agreed that, funds permitting, it was desirable to purchase immediately at the low price level as much as three or four years' supply; that is, from 500,000,000 to 800,000,000 pounds of rubber. The investment required for purchasing a quantity of this magnitude at an average price of 3 cents a pound would be from $15,000,000 to $24,000,000. Because of lack of funds, however, this program could not be carried out in full, and the company was forced to limit its forward purchases to a much smaller amount.

Because of the magnitude of the operation it was not feasible to cover the company's forward needs through operations in futures on The Rubber Exchange of New York, Inc.[1] Total trading in futures on this exchange averaged only about 1,000,000,000 pounds a year. If the company attempted to accumulate the required number of futures contracts to cover its needs for any substantial period in advance, it would become the largest single factor in this market and in effect be bidding the price up against itself. This exchange had been established for the convenience of dealers wishing to trade in small lots and had never been large enough to assist manufacturers in carrying out hedging or accumulative transactions of any magnitude.

In June, 1932, in addition to the company's normal working capital there was available in the company's treasury only about $10,000,000, and because of successive annual operating deficits the company was in no position to borrow additional funds. For several years the company had been using as much cash as it could spare from working capital for the purchase and retirement of its own bonds. In 1932 the company's outstanding bonds, which bore a 5% and a 6½% coupon, were selling at about

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[1] After 1933 on Commodity Exchange, Inc.

$25 per $100 par. At these prices bonds with an aggregate face value of several million dollars appeared to be available. Executives of the company decided that a part of the $10,000,000 not required as working capital should be set aside for (1) the retirement of a portion of the company's funded debt and (2) advance rubber purchases. Between June, 1932, and June, 1933, about $3,000,000 was used for debt retirement, and the amount of cash available for accumulation of rubber inventories during this period was thereby reduced to approximately $7,000,000. During the same period the purchasing committee made successive authorizations allowing the director of purchases to extend further and further the company's inventory position by purchases of spot rubber and rubber in dealers' hands in Far Eastern ports or in transit therefrom. In June, 1933, as a result of continued accumulation, the company had commitments for approximately 200,000,000 pounds of crude rubber or about 15 months' supply at the current rate of operations. Most of this rubber had been accumulated at prices between 3 cents and 4 cents a pound. About 50,000,000 pounds of it was in storage in company plants. Another 100,000,000 pounds was stored at company expense in New York warehouses. Delivery of the remainder was due within 60 days.

Between March and July, 1933, the price of rubber rose from 3 cents a pound to 8 cents a pound. This advance was the result of a number of factors, including the devaluation of the dollar, an increased activity on the part of manufacturers using rubber, a general feeling of optimism regarding the commodity price structure, and a widespread belief that the economic world was generally on the upgrade after years of increasing depression.

In July, 1933, the director of purchasing of the Reynolds Rubber Company believed that the price advance had about run its course. He saw nothing in the statistics of stocks, shipments, and consumption of rubber to indicate that in the near future there would be much change from the current price of 8 cents a pound. He, therefore, advocated that the company return to the hand-to-mouth inventory policy that it had commonly practiced in the past during periods of instability and declining prices. The purchasing committee agreed to this policy, and during the remainder of 1933 the company made no purchases of rubber but instead drew from its inventory. During this period the company used approximately 80,000,000 pounds of rubber as against 60,000,000 pounds for the same period in 1932. The company's estimated use of rubber for the first half of 1934 was 140,000,000 pounds, as against 90,000,000 pounds actually used in the first half of 1933. In the beginning of January, 1934, the company's crude rubber inventory was approximately 120,000,000 pounds, or about 5 months' requirements. Thus, because of increased manufacturing activity, the 200,000,000 pounds of rubber, which had originally been expected to cover 15 months, had proved to be sufficient for only 11 months.

In January, 1934, the director of purchases believed that the anticipated increase in rubber consumption in 1934 would relieve the pressure of heavy stocks, absorb the expected increases in 1934 rubber production, and lead to substantial price advances during the year. He pointed out that conferences were currently being held between Dutch and British rubber interests which would probably result in the adoption of some form of restriction. It was his understanding that the purpose of such restriction would be to raise the price of rubber to about 16 cents a pound. He therefore recommended that the company re-enter the market, not only for the purpose of replacing the rubber currently being used, but to re-establish the inventory at the 200,000,000 pound level of June, 1932. This proposal was accepted by the purchasing committee.

By May, 1934, the company had again succeeded in accumulating 200,000,000 pounds of rubber. Part of this amount was in the company's warehouses and part of it was on contract with dealers for future delivery. The company was able to meet its purchase obligations by drawing from its cash reserves and the proceeds on loans made possible by its improved profit position (its bonds were rapidly approaching par).

On June 1, 1934, a restriction plan to which all large producing areas were parties went into effect. The salient features of this new plan were as follows:

1. Maximum quotas based on potential production were established for the various producing territories. The maximum for each year between 1934 and 1938 was increased sufficiently to provide for the added output of rubber trees maturing during the period.
2. Periodic decisions were to be made as to the percentage of each territory's quota that would be currently exportable. The object

was gradually to reduce these allowable percentages of the maximum sufficiently to bring stocks down to normal levels.

3. Replanting was to be limited to 25% of the existing acreage, thus providing for a moderate amount of depreciation but preventing widespread evasion of the intent of the regulation by replacement of poor trees with young and more productive trees.

4. The exportation of planting materials was prohibited in order to prevent the opening up of new and unregulated areas.

5. Any abnormal accumulation of stocks within producing countries was prohibited.

In the opinion of the director of purchases this restriction plan would within a year probably be successful, not only in raising the price of rubber to 16 cents a pound, the level desired by the interests participating in the restriction plan, but also in improving the statistical position of rubber by reducing stocks and limiting production. He believed that the defects that caused the ultimate failure of the Stevenson Plan did not exist under the new plan. The Stevenson Plan had failed because (1) the Dutch refused to cooperate in restriction, (2) new areas had been devoted to rubber planting, and (3) the participants in the plan had refused to relax the severity of restriction as prices advanced. Under the new plan all these defects had apparently been corrected.

During the period of reaccumulation of stocks to the 200,000,000 pound level, the price of rubber advanced from about 9 cents to 13 cents a pound. When the price reached 13 cents a pound in May, 1934, the director of purchases believed that the advance would temporarily give way to a period of price stability. He therefore recommended that the company's stocks of rubber be allowed to diminish to a level between 80,000,000 and 100,000,000 pounds, or about 4½ to 6 months' supply. This proposal was carried out, and for the remainder of 1934 the company made purchases on a day-to-day replacement basis.

During the latter half of 1934 the company's inventory of crude rubber was sufficient to insure a continuity of production in the event of difficulty in the procurement of spot or near-by deliveries. The director of purchases believed that by carrying moderate inventories the company could protect itself against the danger of shortage and at the same time be in a position to participate in the expected moderate advance in price to about 16 cents a pound.

The average cost of the rubber used by the Reynolds Rubber Company between 1932 and 1934, as a result of its forward purchasing policies, was about 2½ cents a pound below the cost which would have been incurred had a hand-to-mouth policy been in effect throughout the period. The company's accounting practice during the period was to charge crude rubber into manufacturing operations at current market prices at the time of use. Profits made from forward buying went directly to the treasury.

The company made all its rubber purchases through dealers located in New York City. The director of purchases had two assistants who negotiated the terms of purchase, including the arrangements as to grades, prices, and delivery. Four inspectors were employed to examine the rubber delivered by the dealers.

The director of purchases instructed the plantation operators as to the types of rubber which they were to prepare. The entire output of the plantations was taken by the purchasing department at current market prices. Such grades as were not used by the company were disposed of outside by the purchasing department. About 65% of the rubber used by the company was third-, fourth-, and fifth-grade smoked sheets, most of which was purchased from dealers. The plantations supplied primarily the higher grades used by the company.

79. LINDSAY HOSIERY COMPANY

USE OF COMMODITY EXCHANGE, INC., TO REGULATE RISK IN FORWARD BUYING

Raw silk was the largest single item of purchase of the Lindsay Hosiery Company, one of the most important producers of silk hosiery in the United States. The company was subject to a substantial speculative risk both in the raw silk normally carried on contract and in inventory and also in the raw silk equivalent of its work in process and finished goods inventory. Although not averse to taking some speculative risk, the officers of the company did limit the quantity of raw silk holdings on which the company carried the entire risk, and any raw silk commitments in excess of this limitation were hedged on the silk futures market of Commodity Exchange, Inc., of New York City.

The function of raw silk purchasing for the Lindsay Hosiery Company was the sole responsibility of the assistant treasurer of the company. His offices were in New York City. The company's plant and main offices were located in Chicago. Since the company used large quantities of raw silk, the silk buyer had to contract several months in advance for some grades of this commodity, particularly those used in comparatively small quantities in the silk industry. On grades for which there was a wide demand, the stocks normally carried by importers and brokers were large enough so that the company did not have to contract in advance. The minimum amount of raw silk in inventory and on contract necessary to maintain the company's operation was approximately a four weeks' supply. This minimum quantity was not composed of a uniform four weeks' supply of all the grades used by the company. It consisted of approximately a three months' supply of those grades of silk for which the company had to contract in advance and only a two weeks' supply of the grades most readily obtainable. The company's forward commitments in raw silk generally covered from six weeks' to ten weeks' requirements.

At one time in the company's history, monthly expenditures for raw silk approached $1,000,000. The decline in both silk prices and the volume of raw silk used by the company after 1929, however, had reduced the volume of monthly expenditures for this commodity to approximately $100,000. The company's normal forward commitment of 700 to 1,200 bales represented a substantial speculative risk. In addition to the risk in raw silk commitments, the company was subject to a still greater speculative risk in the raw silk content of its work in process and finished goods inventories. The raw silk equivalent of these inventories was normally about 1,400 bales.

Since the cost of raw silk represented less than 15% of the wholesale price of hosiery, only the major changes in silk prices affected hosiery prices. A hosiery manufacturer therefore could not enjoy so complete a raw material hedge as could the manufacturer of flour or of cotton goods. For this reason, the management of the company never attempted to hedge the silk content of its work in process or finished goods inventory. It did, however, frequently hedge part of the company's forward commitments in raw silk. It was the policy of the company to vary its risk in accordance with its financial position and the management's appraisal of current conditions in the hosiery industry and on the raw silk market.

The amount of raw silk on which the company carried a speculative risk was fixed at weekly intervals by a conference of executives at the Chicago office. The silk buyer participated in this conference by submitting a weekly report on conditions in the raw silk market together with his recommendation as to forward commitments. Actual determination of the specific number of weeks of forward coverage to be carried by the company was definitely a management responsibility, however. As a matter of policy the company executives never fixed the amount at more than a ten weeks' supply. The quantity of each grade of raw silk committed for and the method of keeping the company's forward commitment at the number of weeks' supply authorized by the management was left to the discretion of the silk buyer. In exercising his discretion in this respect, the silk buyer entered into futures transactions on Commodity Exchange, Inc.,[1] to supplement transactions in actual silk, thereby regulating the amount of risk borne by the company.

In order to set forth accurately the amount of raw silk risk which the Lindsay Hosiery Company carried, the company's silk buyer had devised a form (see Exhibit 1) on which could be recorded the company's weekly silk position. The upper section of the form indicated the company's holdings in raw silk, whether in inventories at its own mill, at the plants of throwsters, en route to the company's plant, in storage at New York City, or on contract. The next section contained information pertaining to the most recent base date, which in Exhibit 1 was the date of the prior quarterly inventory taking. This section showed the amount of raw silk in process and the raw silk equivalent in finished goods as of the base date, and the amount of raw silk that had entered production since that date. The sum of all the foregoing items gave

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[1] See Appendix A for information concerning both the raw silk futures market of Commodity Exchange, Inc., and the spot market for raw silk.

EXHIBIT 1
LINDSAY HOSIERY COMPANY
Silk Position* as of August 4, 1934

	August 4		July 28		Audited inventory June 30
Raw silk in storage at Chicago	170		145		
Raw silk in storage at throwsters	60		80		
Raw silk en route to Chicago	50		88		
Raw silk in storage at New York	71		26		
Raw silk on contract	785		715		
Total raw silk ahead of production		1,136		1,054	1,113
Thrown silk inventory as of June 30	502		502		502
Delivered to Chicago throwing since June 30	427		369		
Delivered to outside throwing since June 30	155		135		
Inventory plus production since June 30		1,084		1,006	
Hosiery inventory equivalent in bales as of June 30		598		598	598
Total available for hosiery sales since June 30		2,818		2,658	
Silk in hosiery sales (estimated) to date		296		218	
Total raw silk risk at date		2,522		2,440	2,213

Estimated sales June 30 to September 30

280,000 Doz. silk content 1,230

Raw silk consumption for week ending August 4

Chicago throwing	58
Outside throwing	20
Total	78

REMARKS: Purchases during the week

July 30	Contract #634	50	Crack 13/15 Aug. at 1.07½
	#635	100	Sp. Crack 20/22 Sept./Oct. at 1.04
August 2	Contract #636	10	Triple A 13/15 Spot at 1.80
	Total	160	

Note: Production will be curtailed to 70% capacity.

Estimated requirements week ending Aug. 11	90
Estimated requirements thereafter	80

* Expressed in bales of raw silk, approximately 133 pounds per bale.

the total raw silk available for hosiery sales since the base date. From this amount was deducted the raw silk estimated to have been contained in the hosiery sales made since the base date. The remainder represented the total raw silk risk carried at the time of the report. The rest of the form was devoted to information pertaining to sales forecasts, probable production requirements, and purchases of raw silk during the preceding week.

A summary of the weekly silk position reports for the period August 4, 1934, through September 22, 1934, is shown in Exhibit 2. On August 4 the company was carrying a full ten weeks' coverage of raw silk. At that time, however, sales of hosiery had declined to a point where the company decided to curtail its volume of production from 100% to 70%. Consequently, the buyer reduced the coverage in terms of bales to correspond with the new production rate. The forward coverage in terms of weeks' production requirements was maintained at ten, however. During the week following this decision it was necessary to purchase 50 bales of Crack and 10 bales of Grand in order to assure a supply of these grades of raw silk. Reduction on the total coverage was accomplished by four offsetting sales transactions in the futures market, two of which were hedge operations on purchases made during the same week and two, on purchases made during the preceding week. The effect upon the company's silk position of the week's transactions was as follows. At the beginning of the week the company owned 1,136 bales. To this commitment were added 60 bales purchased on the spot market. From the total were deducted (1) 210 bales sold on the futures market for hedging purposes and (2) 90 bales put into production during the week. The net commitment of the company at the end of the week was therefore 896 bales.

In the buyer's opinion, the market had become somewhat weaker during the week ending August 18. He therefore recommended to the officers of the company that total coverage in terms of bales be allowed to decline. This recommendation was adopted, and total forward coverage in terms of weeks was reduced to nine. Market sentiment strengthened somewhat in the following week, and total coverage in terms of bales was maintained. The plant's production schedule was reduced, however, so that the number of weeks' coverage was raised, despite the fact that only 70 bales of silk were purchased while 74 bales were put into production during the week. In the week ending September 1, the market

EXHIBIT 2
LINDSAY HOSIERY COMPANY
Transactions in Raw Silk and Silk Futures
August 4–September 22, 1934

Week ending	Total coverage (end of week)		Transactions during week												No. of bales actually used during week
			Spot market (or actual silk contracts)						Futures—Commodity Exchange, Inc.						
	Bales	Estimated weeks' coverage*	Date	Transaction No.	Bought or sold	No. of bales	Description	Price, dollars per pound	Date	Transaction No.	Bought or sold	No. of bales	Month	Price, dollars per pound	
Aug. 4	1,136	10	July 30	634	B	50	Crack 13/15 Aug. Del.	$1.07½							78
				635	B	100	Sp. Crack 20/22 Sept./Oct.	1.04							
			Aug. 2	636	B	10	Triple A 13/15 Spot	1.80							
Aug. 11	896	10	Aug. 8	637	B	10	Crack 13/15	1 10	Aug. 7	634	S	50	Dec.	$1.12½	90
						10	Grand 13/15 Spot	1 20	8	637	S	20	Mar.	1.13½	
			Aug.10	638	B	40	Crack 13/15 Prompt	1.15	9	635	S	100	Mar.	1.17¾	
									10	638	S	40	Feb.	1.18	
Aug. 18	811	9													85
Aug. 25	807	10	Aug. 21	639	B	70	Crack 13/15 Sept. Del.	1.10							74
Sept. 1	722	9													85
Sept. 8	807	8	Sept. 5	640	B	40	Grand Double Extra 13/15 Spot Del.	1.22	Sept. 7	634	B	50	Dec.	1.11½	105
										635	B	100	Mar.	1.12¾	
Sept. 15	1,060	10	Sept. 10	641	B	100	Grand Double Extra 13/15 Oct./Nov. Del.	1 21	Sept. 11	638	B	40	Feb.	1.11 1.11½	107
			13	642	B	100	Triple A 20/22 Nov./Dec. Shipment	1 36							
				643	B	100	Crack 13/15 Oct. Del.	1 10	11	637	B	20	Mar.	1.11½	
Sept. 22	1,102	10	Sept. 19	644	B	100	Sp. Grand 13/15 Spot	1 40	Sept. 21	642	S	100	Mar.	1.14	118
			19	645	B	160	Sp. Crack 20/22 Nov./Dec. Del.	1.08							

* Estimated from mill schedules which vary somewhat from actual bales used.

again weakened, and coverage was allowed to drop off to the extent of the number of bales absorbed by production during the week. On September 3, owing to a strengthening of the hosiery market, the management of the Lindsay Hosiery Company decided to return to full-time production. It was estimated that the factory would use 110 bales a week under the new production schedules. During the week ending September 8, however, the tone of the silk market being dull, forward coverage was not brought up to the maximum. At the end of the week, the company was covered for a period of eight weeks in advance. In the following week a strengthening of the market led the officers to believe that it would be wise to cover to the maximum again. The silk buyer obtained this coverage by contracting for 300 bales of silk for actual delivery and by liquidating hedges to the extent of 60 bales. During the week ending September 22, because of an increase in the rate of production, forward commitments were extended to maintain the 10 weeks' coverage.

Each transaction made by the Lindsay Hosiery Company on the futures market was identified in the company's records with a specific purchase of actual silk. Thus transaction No. 637 consisted of a purchase on the spot market, an offsetting sale on the futures market, and a subsequent purchase on the futures market to liquidate the hedge. In this instance the actual silk was hedged for the period during which the silk buyer desired to limit the speculative risk of the company. Five weeks later the silk buyer liquidated the hedge, not because the actual silk involved had gone into production, but because the officers wished to have the company assume additional speculative risk. The brokerage cost of both selling and buying back a futures contract on the silk exchange was 1½ cents a pound. Since each futures transaction was identified with a transaction in actual silk, the price of the actual silk was kept open in the company's records until the hedge was withdrawn. Thus the purchase of Crack 13/15 deniers white raw silk on August 8 was entered on the company's books as "Open, 2 cents off March futures price."[1] When the hedge was

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[1] Sale price March futures (per pound)	$1.13½
Cost of actual silk	1.10
Credit differential	$0.03½
Less: brokerage, in and out	0.01½
Net credit differential	$0.02

withdrawn on September 11, the purchase price of the March contract was $1.11½ a pound. The net cost to the company of the Crack 13/15 purchased on August 8 was thus computed to be $1.09½.[1]

In the same way the cost of Grand 13/15 deniers white raw silk was carried on the books as "Open, 8 cents on March futures price"[2] until the hedge was completed. At that time the cost to the company was computed to be $1.19½ a pound. On the spot market of September 11, Crack 13/15 was quoted at $1.11½ and Grand 13/15 at $1.20½ a pound.

Transaction No. 642 illustrates another way in which the exchange was occasionally used by the silk buyer of the Lindsay Hosiery Company. On September 13 an importer offered to sell 100 bales of Triple A 20/22 deniers white raw silk for November and December shipment from Japan at $1.36 a pound, c.i.f. New York City. Triple A was 90% silk, a higher grade than any that was tenderable against futures exchange contracts. The price of $1.36 a pound was 4 cents below the current spot price in New York and moreover represented a desirable spread between the price for that grade and the current futures quotations. The normal spread between Triple A 20/22 raw silk and the exchange basis grade was approximately 30 cents a pound. The buyer accepted the offer on September 13 with the intention of selling a contract on the silk exchange and thereby hedging the advantageous differential. Since the offer specified shipment from Japan during November and December, the silk would arrive to be accepted in New York during December and January. The buyer, therefore, decided to sell a March futures contract for 100

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[1] Cost of Crack 13/15 raw silk may be proved as follows:

Cost of actual silk (per pound)		$1.10
Selling price of hedge contract	$1.13½	
Buying price of hedge contract	1.11½	
Gross profit on hedge	$0.02	
Deduct: brokerage, in and out	0.01½	
Net profit on hedge transaction		0.00½
Net cost of silk		$1.09½

[2]

Sale price March futures (per pound)	$1.13½
Cost of actual silk	1.20
Debit differential	$0.06½
Add: brokerage, in and out	0.01½
Net debit differential	$0.08

Exhibit 3
Lindsay Hosiery Company
Silk Sales Contract for Transaction No. 645

IMPORTER & CO., LTD.
New York City
Raw Silk

New York, September 13, 1934

IMPORTER & CO., LTD., hereby sell and

Lindsay Hosiery Company
(Purchaser's Name)

Chicago, Illinois
(Purchaser's Address)

hereby purchase the raw silk hereinafter described upon the following terms and conditions:—

If at any time the financial responsibility of the purchaser, or the credit risk involved, shall become unsatisfactory to the Seller, the Seller may require cash, or security satisfactory to the Seller, upon subsequent deliveries of silk hereunder; the election by the Seller to require such cash or security shall not impair the obligation of the purchaser to take and pay for the goods. All of the terms and provisions of the Raw Silk Rules of the Silk Association of America, Inc., approved and adopted by its Board of Managers December 10th, 1924, and all subsequent amendments thereto, not inconsistent herewith, are incorporated as a part of this contract.

Every dispute, of whatever character, arising out of this contract must be settled by arbitration in New York to be conducted in the manner provided by the by-laws, rules, and regulations of the Silk Association of America, Inc., governing arbitration. Rate of discount 3% per annum. Interest on deferred deliveries 6% per annum as heretofore.

Bales	Description	Size	Price per lb.
One Hundred (100)	Japan Filature Triple A White *These goods are purchased for resale in the raw or converted state.*	20/22	$1.36 (One dollar thirty six cents) c.i.f. New York

WEIGHT Yokohama Invoice Weight

TERMS OF PAYMENT, SUBJECT TO FOREGOING PROVISIONS Confirmed prime bankers' letter of credit at 90 days' sight on New York.

SHIPMENT from Japan November/December 1934 via Panama Canal
MARINE INSURANCE to be covered by shipper.

IMPORTER & CO., LTD. (Seller)

by.................................... Atty.

Please sign this contract in duplicate, in the name of the firm or corporation, by a member of the firm or an officer of the corporation and return one copy promptly.

(Purchaser)

by....................................

bales to cover this purchase. The tone of the futures market being noticeably dull on that date, the buyer delayed placing the hedge. On September 21, the hedge contract was sold at a price of $1.14 a pound. On November 16, in order to adjust the company's total raw silk commitment, the buyer withdrew the hedge by purchasing an offsetting March contract for 100 bales at a price of $1.21½..

Exhibit 3 shows the contract form used in the actual purchase of the 100 bales of Triple A white. It is illustrative of forms customarily used in raw silk transactions.

APPENDIX A

THE RAW SILK MARKET, 1934

The world's supply of raw silk was produced chiefly in Japan, China, Italy, and France, with Japan contributing approximately 85% of the total. Silk cocoons were produced by farmers as an agricultural crop. In Japan, three crops came on the market each year: the spring crop, constituting 60% of the total, was ready for reeling in the middle of June; the summer crop, constituting about 10% of the year's supply, was ready in July; and the autumn crop, constituting the remaining 30%, was ready late in August. Never was the quality of the last two crops so high as that of the early one.

The cocoon crop was purchased from the farmers by reeling establishments or filatures, which cleaned the cocoons and reeled the silk filaments from them. The filaments, which were from 500 to 1,000 yards long, were unwound from the cocoons singly and then combined in strands of from three to twelve, the gum on the filaments serving to cement them together into a thin thread. This operation required a large amount of skilled labor since the final quality of any raw silk was determined primarily by the perfection and evenness with which the threads had been reeled. While the number of filaments in a thread varied, the common numbers in Japan were five and six. This number made the thread designated as 13/15 deniers silk. These two figures referred to the minimum and maximum weight in deniers (0.05 gram) of a skein of 450 meters. Since thread varied as much as 20% in size even in the best silk, it was impossible to set limits closer than two deniers a skein. Most raw silk came on the market in Japan and in New York in the form of skeins of this thread which had already gone through the one manufacturing process of reeling.

The raw silk market for the United States was centralized in New York City. Since this country was the largest consumer of raw silk in the world, the New York market was an important factor in the position of the world raw silk market. For this reason all the large international concerns, exporting raw silk from the producing countries, had branch offices in New York City. From these concerns and from local New York dealers who imported silk into this country, raw silk users in the United States purchased their requirements customarily on contracts with specified prices and delivery conditions. Several types of delivery were specified in these contracts. "Spot" delivery technically meant delivery within the current month, but generally implied a period of no longer than two weeks. "Prompt" delivery covered a period beginning not sooner than two weeks and ending not later than four weeks. In other instances a specific month of delivery or a specific month of shipment from the producing country was stipulated.

In 1913 there were 196,460 bales of raw silk imported into this country; in 1927 imports had increased to 552,441 bales, the value of which was over $400,000,000. During this period of growth the only facilities for trading in raw silk futures had been the Yokohama and Kobe exchanges in Japan. The use of these exchanges for hedging purposes involved double brokerage fees for all transactions, the loss of one day's time, and hedging yen exchange for complete protection. Moreover, it was generally considered in the United States that these exchanges were not sufficiently reliable for hedging purposes. The trading unit on these exchanges was one-tenth of a bale; the smallness of this unit had promoted a great deal of public speculative interest in the exchanges. The increasing domination of this speculative interest had caused the majority of raw silk dealers and all the silk manufacturers in this country to refrain from using the exchanges for hedging purposes. In September, 1928, owing to the existing unsatisfactory facilities for futures trading, American members of the industry organized the National Raw Silk Exchange, Inc.[1]

There was no spot or cash market in connection with the National Raw Silk Exchange, Inc. Its only use was for the buying and selling of futures contracts. It was designed primarily to afford hedging facilities for manufacturers, dealers, and importers, who otherwise were subject to a heavy price risk in their raw silk inventories and contracts. The organizers of the exchange had made a study of the existing commodity exchanges, particularly those in New York City, and had sought to include in the details of the exchange's mechanism the best practice as proved by the experience of other exchanges. As finally organized, this exchange included an inspection bureau for testing and grading silk as well as a clearing association to facilitate settlements.

The silk futures contract used on the exchange was as follows:

COMMODITY EXCHANGE, INC.
Japanese Raw Silk Contract

New York, N.Y., ...19...

A. B. have this day $\genfrac{}{}{0pt}{}{\text{(sold)}}{\text{(bought)}}$ and agreed to $\genfrac{}{}{0pt}{}{\text{(deliver to)}}{\text{(receive from)}}$ C. D. 10 bales of Japanese Raw Silk (about 1,300 pounds), at the price of .... dollars and .... cents per pound for Exchange Grade D, with additions or deductions for other grades and sizes (deniers) as provided by the By-Laws, Rules and Regulations of Commodity Exchange, Inc., deliverable from licensed warehouse in the Port of New York, between the first and last delivery days of ....[2]

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[1] In May, 1933, it joined the newly organized Commodity Exchange, Inc.

[2] "Trading in contracts for future delivery of silk is carried on in eight successive calendar months; that is, the current calendar month and the seven succeeding calendar months; e.g., in the month of October, contracts may be made to receive or deliver raw silk in that month or in any one of the seven following months." Julius B. Baer, *National Raw Silk Exchange, Inc.*, 1928.

> inclusive, the delivery within such time to be at seller's option, in one warehouse, upon notice to buyer, as provided by the By-Laws and Rules of Commodity Exchange, Inc.
>
> Either party may call for a margin, as the variations of the market for like deliveries may warrant, which margin shall be kept good.
>
> This contract is made in view of, and in all respects subject to the By-Laws, Rules and Regulations of Commodity Exchange, Inc.
>
> For and in consideration of One Dollar ($1.00) to the undersigned, in hand paid, receipt whereof is hereby acknowledged, the undersigned accepts this contract with all its obligations and conditions.

All contracts entered into on the exchange were for Grade D, the basis grade "with the option to the seller of delivering any one of" 12 grades of raw silk which the by-laws of the exchange set up as deliverable on futures contracts. Provision was made for delivery of these grades in order to give the price structure of the futures market a broad foundation; the 12 grades tenderable against contracts represented approximately 90% of all Japanese raw silk sold in the United States. Delivery was valid on the transfer of storehouse receipts of certified silk in specified New York warehouses. The 12 grades of silk tenderable against futures contracts were designated by letters on the exchange and by trade names on the spot market. The classification of grades was as follows:

Commodity Exchange, Inc.	Spot Market	
A	Special Grand	13/15 Deniers White
B	Grand	13/15 Deniers White
C	Special Crack	13/15 Deniers White
D (basis)	Crack Double Extra	13/15 Deniers White
E	Double Extra	13/15 Deniers White
F	Best Extra	13/15 Deniers White
AW	Special Grand	20/22 Deniers White
BW	Grand	20/22 Deniers White
CW	Special Crack	20/22 Deniers White
AY	Special Grand	20/22 Deniers Yellow
BY	Grand	20/22 Deniers Yellow
CY	Special Crack	20/22 Deniers Yellow

In the by-laws of Commodity Exchange, Inc., provision was made for an adjustment committee of nine registered members of the silk trade group to set the price differentials between tenderable grades. This committee had its regular meeting on approximately the third from the last business day of each month and could call special meetings at any time to adjust grade differentials. The differentials were determined on the basis of the spot markets of Japan and the United States and, when fixed, remained in effect until the next meeting of the committee. It had not been necessary to adjust differentials between the regular monthly committee meetings during 1933 or 1934. Price differentials between tenderable grades for each month of 1934 were as shown in Table 1.

TABLE 1
Price Differentials between Tenderable Grades of Raw Silk, Commodity Exchange, Inc., New York
January–December, 1934
(Cents per pound)

Grade	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
13/15 Deniers White:												
A	+28	+28	+30	+30	+30	+30	+28	+28	+28	+28	+30	+28
B	+15	+15	+15	+15	+15	+15	+12	+12	+12	+12	+15	+13
C	+ 7	+ 7	+ 7	+ 7	+ 7	+ 7	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5
D	B	A	S	I	S			G	R	A	D	E
E	− 2	− 2	− 2	− 2	− 2	− 2	− 2	− 2	− 2	− 2	− 2	− 2
F	− 5	− 5	− 5	− 5	− 5	− 5	− 5	− 5	− 5	− 5	− 5	− 5
20/22 Deniers White:												
AW	*	+ 4	+ 1	+ 1	*	+ 8	+ 5	+ 2	+ 2	− 3	− 1	+ 1
BW	− 5	*	− 3	− 3	− 5	+ 3	*	− 2	− 2	− 7	− 5	− 3
CW	− 7	− 3	− 5	− 5	− 8	*	− 3	− 4	− 4	− 9	− 7	− 5
20/22 Deniers Yellow:												
AY	− 5	− 3	− 4	− 6	− 9	− 4	− 3	− 3	− 5	− 5	− 7	− 9
BY	− 8	− 5	− 6	− 8	−11	− 8	− 6	− 6	− 8	− 8	−10	−12
CY	−10	− 7	− 8	−10	−13	−10	− 8	− 8	−10	−10	−12	−14

* Same as Basis.
Source: Commodity Exchange, Inc., *Daily Market Reports.*

The problem of determining what grades should be tenderable against exchange contracts and of fixing uniformly accepted grades had been one of the greatest difficulties encountered by the exchange. The raw silk market was characterized by a lack of standardization in the specifications of apparently the same grades offered by different importers of raw silk. Furthermore, there was no uniformly accepted method of testing and grading raw silk. The exchange met these problems by developing a method of grading silk and by drawing up grade specifications which were acceptable to the industry. A New York testing company was absorbed by the exchange for the purpose of grading and certifying all raw silk tendered against exchange contracts.

The lack of uniformity in the raw silk market was further indicated by the variations in selling prices quoted by different dealers on comparable grades of raw silk. Even at the end of 1934 it was still impossible to determine a completely satisfactory spot price for a given grade. Aside from the variations in prices quoted, no one quotation could be considered completely reliable since frequently a large purchase could be made below this price. Commodity Exchange, Inc. in its *Daily Market Report* listed as spot prices for the different tenderable grades of raw silk the average of the five lowest quotations made by ten representative dealers regularly contacted for prices.

Table 2 shows the daily volume of trading in terms of bales for the year 1934. Table 3 shows the volume of Japan's silk imported into the United States, the number of bales sold on Commodity Exchange, Inc., and the percentage of deliveries against exchange contracts for each month of 1933 and 1934. Table 4 indicates data on the daily spot

TABLE 2
Daily Volume of Trading in Japanese Raw Silk, Commodity Exchange, Inc., New York
January–December, 1934
(Expressed in bales)

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*	2,140	1,630	*	1,030	820	*	1,180	*	720	500	*
2	470	1,070	990	720	690	*	450	410	*	590	860	*
3	1,320	*	*	530	530	*	270	1,430	*	640	*	2,940
4	450	*	*	1,000	550	250	*	*	290	1,010	*	1,710
5	640	1,350	520	1,040	*	320	820	*	290	730	1,430	1,520
6	*	950	910	970	*	770	580	570	740	*	*	810
7	*	1,150	730	*	730	2,140	*	450	680	*	1,820	1,680
8	620	840	670	*	690	420	*	1,040	*	270	1,700	*
9	710	1,100	390	800	1,430	*	480	1,890	*	580	1,230	*
10	550	*	*	700	540	*	270	2,220	1,350	930	*	910
11	480	*	*	610	1,120	570	1,140	*	1,880	1,330	*	1,570
12	910	*	1,480	2,140	*	340	810	*	1,070	*	*	1,530
13	*	800	550	1,040	*	2,170	240	870	140	*	3.500	1,690
14	*	970	1,880	*	620	950	*	600	1,100	*	1,700	1,390
15	1,490	810	2,210	*	650	850	*	300	*	560	1,090	*
16	1,280	780	1,780	1,600	420	*	480	560	*	500	2,190	*
17	500	*	*	1,340	980	*	320	690	440	320	*	1,250
18	180	*	*	570	1,090	580	480	*	1,530	940	*	720
19	490	1,490	860	970	*	1,080	910	*	400	1,420	750	1,960
20	*	620	750	1,880	*	2,680	940	1,140	1,070	*	1,530	870
21	*	1,100	830	*	440	1,280	*	1,400	2,640	*	2,730	1,190
22	1,960	2,650	540	*	310	1,820	*	1,600	*	1,480	1,860	*
23	1,000	*	510	1,930	600	*	1,940	1,230	*	600	1,960	*
24	1,830	*	*	1,910	570	*	1,400	1,400	1,630	720	*	*
25	1,370	*	*	1,630	670	1,770	570	*	1,080	1,310	*	*
26	710	3,350	1,020	2,080	*	1,810	1,000	*	560	820	3,610	1,990
27	*	720	670	750	*	1,290	850	2,170	980	*	2,450	1,760
28	*	730	1,620	*	1,140	910	*	2,510	600	*	1,590	4.340
29	1,430		1,010	*	600	1,250	*	1,140	*	750	*	*
30	1,440		*	1,460	*	*	810	740	*	690	1,070	*
31	1,060		*		870		1,320	1,870		270		3,260

* Exchange closed.
Source: Commodity Exchange, Inc., *Daily Market Reports.*

prices of Crack 13/15, Grand 13/15, and Triple A 20/22 white raw silk, and the prices of February and March futures contracts for the period of August 1 through December 31, 1934.

TABLE 3

Data on Raw Silk Imports, Volume of Trading, and Physical Deliveries against Exchange Contracts

January, 1933–December, 1934

Date	Bales of Japanese raw silk imported into U. S.	Number of bales sold on Commodity Exchange, Inc.	Percentage of physical deliveries against exchange contracts
1933:			
January	47,807	29,340	3.2%
February	21,362	21,870	1.7
March	21,905	19,490	0.7
April	38,374	41,350	0.6
May	40,163	29,130	11.1
June	41,577	64,780	2.6
July	52,665	49,610	1.5
August	40,753	35,530	1.7
September	46,870	22,110	1.5
October	45,284	37,340	2.6
November	30,778	33,800	2.3
December	31,856	20,340	3.3
1934:			
January	27,093	20,890	2.7
February	28,735	22,620	2.7
March	31,559	21,550	4.9
April	35,121	25,670	2.3
May	38,034	16,270	4.4
June	30,217	24,070	7.4
July	37,887	16,080	7.8
August	28,078	27,410	8.3
September	49,858	18,470	4.8
October	38,493	17,180	5.3
November	47,023	33,570	8.5
December	28,908	33,090	8.1

Source: Commodity Exchange, Inc., Monthly Statistical Supplement to *Daily Market Reports*, May, 1935.

TABLE 4
Raw Silk Prices
August 1–December 31, 1934
(Dollars per pound)

Date	Daily spot prices			Futures prices	
	Crack White 13/15	Grand White 13/15	Triple A White 20/22	February contract	March contract
August:					
1	1.13½	1.23	......	1.11	1.11½
2	1.13½	1.23	......	1.11½	1.11½
3	1.14	1.23	......	1.11½	1.11½
6	1.15½	1.24½	......	1.11	1.12½
7	1.15½	1.24½	......	1.12	1.13
8	1.16	1.25	......	1.14	1.13½
9	1.18	1.28	......	1.16½	1.16½
10	1.22½	1.32	......	1.16½	1.16½
13	1.19	1.29½	......	1.17	1.16½
14	1.19	1.29½	......	1.15½	1.15½
15	1.19	1.29½	......	1.16	1.16½
16	1.19	1.29½	......	1.16½	1.16½
17	1.18	1.29	......	1.14½	1.14½
20	1.15	1.24	......	1.12½	1.12½
21	1.15	1.24	......	1.14	1.13½
22	1.16	1.25½	......	1.16	1.15½
23	1.16	1.25½	......	1.15	1.15
24	1.16	1.25½	......	1.15	1.15½
27	1.16½	1.26½	......	1.15	1.15½
28	1.16½	1.26½	......	1.14½	1.14
29	1.16	1.25½	......	1.14	1.14½
30	1.16	1.25	......	1.13½	1.14
31	1.15	1.24	......	1.12½	1.18½
September:					
1	......	......	1.45		
4	1.14	1.23	......	1.12	1.12
5	1.14½	1.23	1.45	1.13	1.13½
6	1.14½	1.23	1.45	1.13	1.13½
7	1.13½	1.22½	1.45	1.12	1.12½
8	1.13½	1.22½	1.45	1.21½	1.18½
10	1.13	1.21½	1.45	1.11½	1.11½
11	1.11½	1.20½	1.40	1.11½	1.11
12	1.11½	1.20½	1.40	1.10½	1.11
13	1.11½	1.20½	......	1.11	1.11½
14	1.12	1.20½	......	1.11½	1.11½
15	1.12	1.20½	......	1.21½	1.18½
17	1.12½	1.21	1.40	1.12	1.12
18	1.14½	1.23	1.42½	1.13	1.13½
19	1.15½	1.26	1.42½	1.14	1.14½
20	1.16	1.26	1.45	1.14½	1.14½
21	1.18	1.28½	1.45	1.18	1.18
22	1.18	1.28½	......	1.21½	1.19½

TABLE 4.—(*Continued*)
Raw Silk Prices

Date	Daily spot prices			Futures prices	
	Crack White 13/15	Grand White 13/15	Triple A White 20/22	February contract	March contract
September:					
24	1.21	1.31	1.50	1.15	1.15½
25	1.18½	1.28½	1.47½	1.21½	1.19½
26	1.18½	1.28½	1.47½	1.14½	1.15
27	1.20½	1.31	1.50	1.15½	1.17
28	1.19	1.29½	1.47½	1.16½	1.16
29	1.19	1.29½	......	1.21½	1.19½
October:					
1	1.19½	1.30		1.14	1.15½
2	1.18	1.29	1.42½	1.14	1.14½
3	1.17½	1.28	1.42½	1.13	1.14
4	1.16½	1.27½	1.40	1.13½	1.13½
5	1.16½	1.27½	1.40	1.15½	1.15½
6	1.16½	1.27		1.21½	1.19½
8	1.17	1.29	1.42½	1.14	1.15
9	1.17	1.28½	1.42½	1.14	1.15
10	1.17	1.28½	1.42½	1.14	1.16
11	1.19	1.31	1.42½	1.17½	1.17½
15	1.21	1.32	1.52½	1.14	1.16½
16	1.21	1.32	1.52½	1.15½	1.16½
17	1.21	1.32	1.52½	1.16	1.16
18	1.23	1.33	1.55	1.16	1.16½
19	1.23½	1.34	1.57½	1.16½	1.16½
22	1.23½	1.35	1.70	1.17½	1.17½
23	1.22½	1.34	1.70	1.16½	1.16½
24	1.22½	1.34	1.70	1.17	1.18
25	1.24	1.35½	1.70	1.17	1.17
26	1.23	1.34½	1.70	1.15½	1.16
29	1.21	1.32	1.55	1.15½	1.16
30	1.21	1.32	1.55	1.16	1.16½
31	1.21½	1.32	1.55	1.16	1.16½
November:					
1	1.21½	1.32	1.55	1.16½	1.16½
2	1.24	1.47	1.57½	1.17½	1.18
5	1.26	1.36	1.57½	1.19	1.20½
7	1.26½	1.36	1.60	1.20½	1.22
8	1.27½	1.37	1.60	1.19	1.19½
9	1.27½	1.37	1.60	1.22½	1.22½
13	1.32½	1.41½	1.62½	1.23	1.24½
14	1.32½	1.41½	1.62½	1.22½	1.23½

TABLE 4.—(*Continued*)
Raw Silk Prices

Date	Daily spot prices			Futures prices	
	Crack White 13/15	Grand White 13/15	Triple A White 20/22	February contract	March contract
November:					
15	1.31½	1.40½	1.62½	1.22½	1.22½
16	1.29½	1.39	1.60	1.21	1.22
19	1.28	1.38	1.60	1.20	1.20½
20	1.28	1.38	1.60	1.23	1.22½
21	1.31	1.42	1.62½	1.25	1.25
22	1.32	1.42½	1.62½	1.24½	1.25
23	1.32	1.43	......	1.24	1.24½
26	1.38½	1.48½	1.70	1.27	1.28
27	1.38	1.48	1.70	1.25½	1.26
28	1.36	1.46	1.70	1.26	1.25½
30	1.45½	1.35	1.70	1.24	1.25½
December:					
3	1.40½	1.50½	1.72½	1.29	1.30
4	1.39½	1.49	1.75	1.28½	1.29½
5	1.39½	1.49	1.75	1.28	1.28½
6	1.37½	1.47	1.75	1.27½	1.29
7	1.37	1.46½	1.75	1.30½	1.30
10	1.36	1.46	1.75	1.27	1.27½
11	1.35	1.44½	1.72½	1.27½	1.30
12	1.36½	1.46	1.72½	1.29	1.29½
13	1.40½	1.50	1.75	1.32	1.32
14	1.42½	1.52	1.75	1.31½	1.33
17	1.38	1.49	1.72½	1.30	1.30½
18	1.36½	1.47½	1.72½	1.28½	1.29
19	1.39	1.49½	1.72½	1.31	1.31
20	1.41½	1.52½	1.75	1.31½	1.32
21	1.41½	1.52½	1.75	1.30½	1.31
24	......	......	1.75		
26	1.40	1.51	1.75	1.32	1.33
27	1.41	1.52	1.75	1.34	1.34
28	1.44	1.55	1.80	1.38	1.39
31	1.49	1.61	1.85	1.41½	1.42

Sources: Triple A 20/22 quotations were taken from the records of the importing concern from which the Lindsay Hosiery Company contracted to take 100 bales on September 13, 1934. Quotations were given only for those days on which the grade was available.

All other quotations were taken from Commodity Exchange, Inc., *Daily Market Reports*, which regularly obtained the offering prices of ten houses. Each daily price shown represents an average of the five lowest offering prices for each grade on the day indicated.

80. WINHALL SILK COMPANY

UTILIZATION OF COMMODITY EXCHANGE QUOTATION AS BASIS FOR FINISHED GOODS PRICE

In May, 1934, the Winhall Silk Company, an eastern United States manufacturer and converter of silk and rayon cloth, was asked to enter into a contract to manufacture a large order of all-silk Canton crêpe, the price of the cloth to be based on the quotation on raw silk futures on Commodity Exchange, Inc., in New York, as of the date called at the buyer's option. The question of whether to accept the proposal hinged on the company's assurance of obtaining raw material at a price which would protect its manufacturing profit.

In the middle of May, 1934, the president of the Bowen Company, a silk cloth wholesaler, informed the Winhall Silk Company that he was in the market for at least 80,000 yards and possibly as much as 320,000 yards of all-silk Canton crêpe. Although the Winhall Silk Company was equipped to convert cloth as well as manufacture it, the wholesaler wanted to take the material in the greige and convert it himself. He stated that in his opinion complete adjustment of the level of raw silk prices had not taken place after the rise culminating in July, 1933, and the current level of raw silk prices was unwarranted by conditions of supply and demand. For this reason, although he wished to be assured of a supply of Canton crêpe, he did not care to place definite orders for it at that time. He suggested, therefore, that a contract be drawn up which definitely committed him to take 80,000 yards of the material with an option on additional 80,000-yard lots up to a total of 320,000 yards. The price of each lot was to be determined by Commodity Exchange, Inc., quotations for grade D (basis grade) August delivery raw silk as of the date called by him. He agreed to call the date for fixing the price of the initial order and either to exercise or to drop his options on additional cloth before June 22. Delivery of cloth was to begin three weeks after a call had been made.

According to the Bowen Company's proposal, the price of the cloth was to be determined as follows. On May 22, the date of the offer, the quotation on grade D August delivery raw silk was

$1.26 per pound. On the basis of this quotation, the price of the cloth was to be 42½ cents per yard. As approximately 1 pound of raw silk was required for every 5 yards of cloth, the selling price of each lot of cloth was to change 2⁄10 cent per yard for every 1 cent per pound difference between the May 22 quotation of grade D August delivery raw silk and the similar quotation on the day selected by the buyer. The selling price of the cloth was fixed at 42½ cents per yard for the base date because the Winhall company could buy raw materials for the cloth at the prices in effect on that date, manufacture the cloth, and obtain its normal operating profit of approximately 10% of the selling price. As of May 22, therefore, the order was desirable.

The executives of the Winhall Silk Company were willing to accept the contract from the production standpoint. If the company obligated itself to deliver the material, it would be forced to reserve roughly 100 looms for each 80,000 yards covered by the contract. Although 400 looms were approximately one-third of the company's production facilities adaptable to Canton crêpe production, more than that number were idle in May, and it was probable that this condition would continue for several months. Furthermore, as the company's regular labor force was working only part time, the company was in a position to guarantee delivery of the cloth within the time and quantity limits stipulated in the Bowen Company's proposal.

The major obstacle to acceptance of the offer was the question of whether the company could obtain raw material for the order at a price which would protect its manufacturing profit. The Winhall Silk Company executives realized that in the event the entire options were exercised at once, an expenditure of approximately $80,000 would be required for raw material. Although there was no danger that this amount would either embarrass the company financially or disrupt the spot market for silk, the company would be taking a risk regarding the price of raw materials. The price of the cloth was to depend upon the futures quotation of grade D raw silk, designated in the raw silk spot market as Crack 13/15 deniers white silk, whereas the raw material for Canton crêpe was Grand 20/22 deniers yellow silk, a grade customarily selling on the spot market at a discount from Crack 13/15 deniers white silk. Since the company's stocks of raw silk were low in May, it would have to buy all the raw silk for the goods in the spot market. This silk could be bought at any time, the company decided, as long as the delivery terms of the contract were fulfilled.

The final decision of the company concerning the proposal rested on the question of whether it could take the risk of procuring Grand 20/22 yellow raw silk at a price bearing the same relationship to futures prices at the date of call as spot price for this grade bore to futures on May 22. In other words, acceptance of the proposal involved either relying on the company's being at least as successful in selecting the date for advantageous buying of raw silk as the Bowen Company was in selecting the date for low futures prices or relying upon Commodity Exchange, Inc., to maintain a constant spread between the spot price of Grand 20/22 deniers yellow silk and the futures price of August delivery Crack 13/15 deniers white silk.

The executives of the Winhall Silk Company decided to accept the contract in the form offered. Since they were inclined to agree with the Bowen Company that silk prices would decline, they decided not to take any further action until later. The executives realized, however, that because the three weeks' delivery period stipulated in the contract would make it necessary to start production immediately after a call was made, this procedure forced the company to depend upon the commodity exchange to preserve a constant spread between future and spot prices of the basis grade raw silk and upon the spot market to preserve a constant differential between the basis grade silk and that required for Canton crêpe.

Shortly after the contract was made, the expected decline in raw silk prices began. No action was taken by either the Winhall Silk Company or the Bowen Company until on June 20 the latter company requested that the time limit be extended from June 22 to July 2. This request was granted in consideration of the Bowen Company's definite commitment to take an additional 80,000 yards of cloth. At this time the Bowen Company was committed for 160,000 yards with an option of taking an additional 160,000 yards of cloth.

On June 27 the Bowen Company called for 80,000 yards of its commitment. On this date futures for grade D August delivery sold at $1.14½. On that day the Winhall Silk Company bought Grand 20/22 deniers yellow raw silk at $1.09 per pound.

On July 2 the Bowen Company called for delivery of the remaining 80,000 yards and at the same time requested that the time limit of one-half of the remaining option be extended until July 9, and that the other half of the option be dropped. This request was allowed. On the July 2 call the price of grade D August delivery silk was not fixed by an actual transaction, but the average of bid and offered prices was taken as the price for the day. The bid price was \$1.12, and the asked price was \$1.13½; hence the basis used for calculation of the selling price of Canton crêpe was \$1.12¾. Raw silk for this lot was bought on the spot market of July 2 for \$1.12 cents per pound. The final option on 80,000 yards was not exercised before July 9 and was thereby automatically dropped.

Several months later the president of the Bowen Company inquired of the Winhall Silk Company whether it would like to enter a similar arrangement again when and if another occasion arose. The officers of the Winhall Silk Company were willing to enter such an agreement provided they had production facilities which they could reserve.

SECTION X

MEASUREMENT OF PERFORMANCE

81. BERWYN MACHINERY CORPORATION

EVALUATING THE PURCHASING FUNCTION

The Berwyn Machinery Corporation manufactured specially designed machinery of all kinds. As a means of demonstrating the value of the purchasing department to the management and of increasing the compensation of the members of that department, the purchasing officer in 1936 submitted to the general manager of the corporation a plan by which the purchasing department personnel would receive a bonus for accomplishment better than a predetermined standard.

The purchasing officer bought all materials and parts used in the manufacture of the machinery. Although inventory control was not under his supervision, the purchasing officer was responsible for ordering in quantities that would be sufficient to meet immediate production requirements and at the same time would avoid maintaining excessive stocks of raw materials. The company expected a turnover of at least five times a year, even in standard materials such as brass and steel which were bought in large quantities.

Purchase requisitions, which originated with either the clerk in charge of stores or the foremen of the various departments, were sent to the purchasing department after they were approved by the factory superintendent. Although no uniform practice was followed, in most instances the requisitions contained only a brief description of the materials or parts, the quantity necessary to fill the immediate need, and the dates on which they were wanted. Occasionally the materials or parts were adequately described on the requisitions, but usually before the purchase order was made out it was necessary for the purchasing officer to add detailed specifications if misunderstandings on the part of the suppliers were to be avoided. The information on the requisition which concerned suppliers, terms, prices, and routing was generally based upon decisions of the purchasing officer. His principal sources of information were his purchase records of previous years and his catalogue files. If the records showed that the quantities purchased by the company during the previous 12 months appeared to justify such action, and if quantity discounts could be obtained, it was the purchasing officer's custom to order an amount larger than that specified on the requisitions without referring the question to either the original requisitioner or the factory superintendent. If a large expenditure was involved, however, he might seek the approval of the factory superintendent.

Beginning in 1930 it had been the practice of the purchasing officer to report each month to the management on some of the activities of his department. Because this report was purely factual, any evaluation of the performance of the purchasing department was possible only after the data for the current month were compared with those of the preceding month and of the same month in the previous year.

EXHIBIT 1
BERWYN MACHINERY CORPORATION
Monthly Report of Purchasing Accomplishment, March, 1931

Items	Present month, March, 1931	Past month, February, 1931	Last year, March, 1930
1. Number of orders issued	460	450	1,050
2. Number of orders closed	430	420	1,000
3. Number of letters written	150	180	240
4. Number of follow-ups mailed	48	45	102
5. Number of debit memoranda issued	26	22	31
6. Number of debit memoranda closed	28	27	29
7. Number of invoices handled	468	499	1,104
8. Number of salesmen interviewed	306	172	284

This report, a sample copy of which is shown in Exhibit 1, summarized the items which made up the regular purchasing routine. The first item was the total number of orders issued during the month. Item 2, "Orders closed," included those orders against which all material had been received. Item 3 recorded the number of letters written. These letters might concern any phase of the purchasing department's work, although in general a letter did not accompany a purchase order, nor were letters ordinarily used to follow up delayed shipments. "Follow-ups," presented in Item 4, were the postal cards or telegrams sent requesting information in regard to delayed shipments. Item 5, "Number of debit memoranda issued," represented requests to suppliers for credit on merchandise returned. Item 6 recorded the number of debit memoranda, originally issued in either the current month or a previous one, which had been finally settled between the Berwyn corporation and the supplier. Item 7 gave the total number of invoices which passed through the department at the end of the month. In Item 8 was included the number of salesmen interviewed during the month. Each day the purchasing officer listed on his calendar pad the names of all the salesmen interviewed by the purchasing department, and the monthly total was derived from this record.

Early in 1936 the purchasing officer set up a somewhat different type of report, based on more detailed information. Exhibit 2 is an example of the summary form in which this information was compiled. In column 1 were given the dates of the working days of the month; in columns 2 and 3, the number of orders issued and the number of items thus ordered; and in columns 4 and 5, the value of the materials ordered each day and the cumulative monthly total. In column 6 was given the number of debit memoranda issued, and in column 7 the number of debit memoranda finally settled during the month. In column 8 the number of letters written by the purchasing department was presented. "Follow-ups" were given in columns 9 and 10. In columns 11 and 12 were the number of purchase orders against which all material had been received and the number of partial slips or reports of incomplete shipments handled. Column 13 gave the number of salesmen interviewed. In column 14 was the total number of invoices which passed through the department at the end of the month. Column 15 recorded the total number of purchase orders outstanding against which no shipments or only partial shipments had been received.

From Exhibit 2 were taken totals of the number of orders issued, orders closed, debit memoranda issued, debit memoranda closed, letters written, follow-ups sent, invoices handled, and salesmen interviewed.

The totals appearing in these columns at the end of the month were then weighted by multiplying each by its corresponding weighting factor to obtain the figure termed "work factor units." The weighting factors were determined by the purchasing officer after he had analyzed the time spent by himself and the various

EXHIBIT 2
BERWYN MACHINERY CORPORATION
Monthly Report of Purchasing Accomplishment, April, 1936

(1) Date	(2) Orders issued	(3) Items	(4) Value	(5) Cumulative total	(6) Debits issued	(7) Debits closed	(8) Letters	(9) Postals	(10) Telegrams	(11) Orders closed	(12) Partial slips	(13) Salesmen interviewed	(14) Invoices	(15) Unfilled orders
													(Not summarized daily)	221
1	19	38	$ 258.00	$ 258 00	2	..	15	4	1	38	1	7		202
2	21	35	2,536.60	2,794 60	..	1	8	3	..	17	4	8		206
3	23	42	366.72	3,161.32	2	1	13	5	3	21	2	11		208
6	28	42	574.82	3,736 14	..	2	7	...	1	15	1	3		221
7	15	28	213 40	3,949 54	3	...	7	8	1	30	3	9		206
8	33	75	1,274 15	5,223 69	..	..	7	3	..	24	4	8		215
9	32	70	1,141 03	6,364 72	1	2	3	3	..	17	2	6		230
10	29	45	596 35	6,961 07	2	4	7	11	..	15	7	5		244
13	25	47	724 15	7,685.22	2	2	4	6	1	23	1	10		246
14	24	44	198 23	7,883 45	4	2	5	5		33	6	8		237
15	18	38	492.15	8,375 60	1	4	. .	...	..	20	3	5		235
16	37	65	790.08	9,165 68	..	1	10	8	3	28	2	6		244
17	31	54	510.31	9,675 99	..	..	10	6	..	28	5	10		247
21	23	29	512.35	10,188.34	..	..	7	12	1	24	3	18		246
22	30	35	2,941.75	13,130 09	2	1	4	10	3	33	7	8		243
23	26	51	474 90	13,604 99	1	2	4	3	..	24	6	8		245
24	40	71	1,517.16	15,122.15	1	..	17	18	..	25	9	7		260
27	27	40	475.42	15,597 57	1	..	7	5	3	23	3	10		264
28	29	32	284 35	15,881 92	4	3	6	7	1	31	5	10		262
29	30	31	650 05	16,531 97	2	4	5	2	..	23	5	11		269
30	24	39	165 85	16,697.82	..	..	5	4	..	23	2	3		270
	564	951	$16,697 82		28	29	151	123	18	515	81	171	667	

members of his department on each of these duties. No time study analysis was made; the decision as to weights was based on the purchasing officer's estimate of the time required to complete each task. The weighting factors were as follows:

	Factor
Orders issued	10
Orders closed	1
Partial orders handled	1
Debit memoranda issued	8
Debit memoranda closed	1
Letters written	6
Follow-ups sent	3
Salesmen interviewed	10
Invoices handled	3

The totals in Exhibit 2 were converted into work factor units by the following method:

Orders issued	564 ×	10 =	5,640
Orders closed	515 ×	1 =	515
Partial orders handled	81 ×	1 =	81
Debit memoranda issued	28 ×	8 =	224
Debit memoranda closed	29 ×	1 =	29
Letters written	151 ×	6 =	906
Follow-ups sent (postals and telegrams)	141 ×	3 =	423
Salesmen interviewed	171 ×	10 =	1,710
Invoices handled	667 ×	3 =	2,001
Total number of work factor units			11,529

This final figure represented the quantity of work done by the department during the month in question. The purchasing officer believed that this figure by itself was relatively useless, even for purposes of comparison; he converted it, therefore, into a ratio to the direct operating expenses of the department by dividing the total figure for work factor units by the direct operating expenses, including such expenses as total salaries of the department, office supplies, telephone and telegraph, postage, heat, light, and power. If, for example, the direct operating expenses of the department were taken as $600 and the above figure of 11,529 work factor units was used, the resulting ratio would be 11,529 divided by 600, or 19.2. The figure computed in this way each month could be used as a means of comparing, month by month, the efficiency with which the purchasing department was performing its routine tasks; the purchasing officer believed, therefore, that this type of report was of some value to the general manager of the Berwyn company.

The purchasing officer recognized that this type of report was wholly inadequate as a means of evaluating the purchasing department's success in performing more intangible duties, such as negotiating lower prices, selecting suppliers who could give good service and high quality, maintaining a high rate of inventory turnover, and eliminating so far as possible factory delay due to defective merchandise and to inadequate supplies of raw materials. Because he considered it necessary to take such intangible duties into consideration, the purchasing officer in 1936 developed a plan which he believed would show more accurately the value of the purchasing department to the company. In his opinion, this plan could be used also as a basis for paying a bonus to the members of the department in relation to their contribution to its efficiency.

The plan developed by the purchasing officer used nine types of data: (1) Figures on the value of the purchases made each month, which were readily available from either the invoice register or a summary similar to Exhibit 2. (2) The total of salaries and other direct operating expenses of the purchasing department, which could be easily obtained from the general books of account. (3) The number of orders issued each month, which could also be taken from the report shown in Exhibit 2. (4) The net variance of actual cost of raw materials from standard costs. The Berwyn Machinery Corporation used a standard cost system under which the net cost variances could be taken monthly from the variances accounts on the company's books. (5) The cost of defective materials, which was also derived from the standard cost system of the company. Defective materials were assigned a cost which included the original purchase price plus such labor and burden, at standard rates, as the defective materials had accumulated up to the time when they were rejected. (6) Cash discounts taken, the figures for which were available in the invoice register. (7) The dollar value of the materials and parts in inventory, as shown in the perpetual inventory records of the company. (8) Inventory withdrawals, or the quantity of materials and parts used in the company's manufacturing operations which was deducted from stocks each month. This information was also shown in the perpetual inventory records. (9) The standard inventory value in dollars as determined by the purchasing officer from the company's past experience.

The purchasing officer then set up a series of ratios or relationships between these items, whereby the purchasing department's efficiency might be demonstrated (see column 1, Exhibit 3).

EXHIBIT 3
BERWYN MACHINERY CORPORATION
Standard Ratios for Measurement of Purchasing Efficiency

Ratio	Standard	Variations	Bonus percentages	
			Plus	Minus
		For each:		
Dept. expense to value of purchases.	1.0% to 1.4%	0.1% under 1.0%	0.2%	
		0.1% over 1.4%		0.2%
Dept. expense to number of orders.	50 cents to 60 cents	1 cent under 50 cents	0.1	
		1 cent over 60 cents		0.1
Value of purchases to number of orders.	$40 to $60	$1 over $60	0.01	
		$1 under $40		0.05
Cash discount to value of purchases.	0.8% to 1.2%	0.1% over 1.2%	0.1	
		0.1% under 0.8%		0.1
Inventory withdrawals to material inventories (beginning).	18% to 22%	1% over 22%	0.3	
		1% under 18%		0.2
Value of defective material to value of purchases.	0.25% to 0.35%	0.05% under 0.25%	0.2	
		0.05% over 0.35%		0.1
Net cost variances to value of purchases.	−3% to −5%	1% under −5%	0.2	
		1% over −3%		0.1
Material inventories (ending) minus standard inventory.	±10%	1% under −10%	0.2	
		1% over +10%		0.2

Using figures representative of the previous five to ten years for the types of data described above, the purchasing officer assigned standard values for these ratios. For example (see column 2, Exhibit 3), departmental expense was calculated to be normally from 1% to 1.4% of the value of purchases. So long as departmental expense was not less than 1% and did not exceed 1.4% of the value of purchases, the purchasing department's operating efficiency was deemed to have equaled, in this respect, the predetermined standard.

After the standards were set, the purchasing officer's next problem was how to resolve better than standard performances into actual bonus payments. He solved this problem by assigning values, as percentages of purchasing pay roll expense, to variations above and below the standards. These values, which were selected arbitrarily by the purchasing officer, were based on his estimate of the value to the company of better than standard performance for each element of the purchasing tasks. For example, for each 0.1% by which the purchasing department succeeded in reducing its current departmental expenses *below* 1% of the value of purchases, it received a *plus* bonus percentage value equal to 0.2%. Correspondingly, for each 0.1% by which current departmental expense *exceeded* 1.4% of the value of purchases, the department received a *minus* bonus percentage value equal to 0.2%.

The balance remaining after subtracting the total of the minus values from the total of the plus values (see column 4, Exhibit 3) was the net percentage of total purchasing department salaries to be distributed as a bonus. The first 50% of this bonus was to be paid to the purchasing officer, and the balance was to be distributed to each of the other members of the department in the direct proportion which the salary of each bore to the departmental pay roll, exclusive of the salary of the purchasing officer. This division of the total bonus was based on the purchasing officer's belief as to the ability of the various members of the department to influence the over-all efficiency of the purchasing function.

In addition to this monthly bonus, the members of the department were to receive an annual bonus computed as a percentage of the profits of the company. This percentage was to be the average of the monthly net bonus percentages, calculated as above, divided arbitrarily by 100.

For purposes of illustration, the purchasing officer used the following figures for a typical month and figured from them the bonus which would be paid.

Number of orders issued	800
Value of purchases	$ 60,000[1]
Purchasing department expense	600
Cost variances	1,200
Defective material cost	150
Cash discounts taken	500
Materials inventory:	
Beginning of month	112,000
End of month	113,000
Inventory withdrawals	35,000
Standard inventory	110,000

[1] A portion of these purchases went directly into production without passing through the materials inventory.

Using these actual figures, the purchasing officer computed the information given in Exhibit 4.

EXHIBIT 4
BERWYN MACHINERY CORPORATION
Computation of Net Bonus Percentage

Ratio	Standard	Actual	Bonus percentage values	
			Plus	Minus
Dept. expense to value of purchases	1.0% to 1.4%	$\frac{\$600}{\$60,000} = 1\%$	0	0
Dept. expense to number of orders	50 cents to 60 cents	$\frac{\$600}{800} = 75$ cents	0	1.5
Value of purchases to number of orders	$40 to $60	$\frac{\$60,000}{800} = \$75$	0.15	0
Cash discount to value of purchases	0.8% to 1.2%	$\frac{\$500}{\$60,000} = 0.83\%$	0	0
Inventory withdrawals to material inventories (beginning)	18% to 22%	$\frac{\$35,000}{\$112,000} = 31\%$	2.7	0
Value of defective material to value of purchases	0.25% to 0.35%	$\frac{\$150}{\$60,000} = 0.25\%$	0	0
Net cost variances to value of purchases	−3% to −5%	$\frac{-\$1,200}{\$60,000} = -2\%$	0	0.1
Material inventories (ending) minus standard inventory	±10%	$\frac{+\$3,000}{\$110,000} = +2.7\%$	0	0
			2.85	1.6
			Net bonus percentage 1.25%	

As illustrative of the computation of the annual bonus, the purchasing officer assumed that a bonus percentage of 1.25% was the average for 12 months. He also assumed that the net profits of the business were $420,000 during the year. One one-hundredth of 1.25% is 0.0125%, and 0.0125% of $420,000 equals $52.50, computed as the bonus due at the end of the fiscal year.

In submitting this plan to the general manager of his company, the purchasing officer pointed out that the salesmen of the concern each month received a bonus for selling more than the standard volume. The purchasing officer was convinced that it was desirable to set up a means of rewarding unusual efforts on the part of those performing the equally important purchasing function. His proposed method appeared to him to satisfy many of the requirements for a workable means of evaluating the purchasing function. All the figures were readily available, and the computations were easy to understand. No great accounting or clerical expense was necessary. In addition, the system was flexible and could readily be adapted to changing conditions by adding or omitting items and by changing the weighting of the factors which affected the department's efficiency rating and the bonus paid.

82. SHAFFER MACHINE TOOL COMPANY

MEASURING THE EFFICIENCY OF THE PURCHASING DEPARTMENT

In November, 1931, the vice president in charge of production of the Shaffer Machine Tool Company started to investigate the operation of the purchasing department. As a result of the general business depression, the sales of the Shaffer Machine Tool Company had dropped 70% from the normal amount. In an endeavor to reduce expenses, the vice president in charge of production was systematically investigating each department under him.

In starting his investigation of the purchasing department, the vice president found, not only that he had no way to estimate the effect of a cut in expenses on the efficiency of the purchasing department, but also that he had never had a sound basis for judging the performance of the purchasing officer or of the department. The sales department, the production department, and the other operating departments of the company submitted reports which gave some basis for a judgment of their work. However, as the vice president observed in discussing the question with another executive, "All I know about Mr. Hatfield [the purchasing officer of the company] is that I like him and he has an honest face."

For several years Mr. Hatfield had voluntarily submitted a monthly report on the activities of his department. One of these reports is shown in Exhibit 1.

The vice president realized that it was impossible to gauge the efficiency of the purchasing department from this report, as there were many important factors which the report did not take into consideration. He knew from experience that even a short report was more than most purchasing officers submitted to their superior officers. Nevertheless, he believed that his company should adopt some method of measuring the efficiency of the purchasing department. He finally summoned his purchasing officer and requested him to draw up a plan that would offer some method of checking the efficiency of the purchasing department.

The purchasing officer was able to find but little published material dealing with the problem assigned to him. He was, however, impressed by an article written by the purchasing

Exhibit 1

Shaffer Machine Tool Company

Purchasing Department—Report for September, 1928

Number in department	25
Number shop orders placed	5,142
Number personal orders placed	226
Total number of orders	5,368
Carloads freight received	40
L.c.l. freight (tons)	191
Parcel post receipts (pieces)	2,611
Express receipts (pieces)	644
Overland truck receipts (pieces)	376
Number letters written	1,564
Number telegrams sent	76
Number invoices handled	5,449
Shipment samples, returned goods, etc.	177
Reports, memoranda, etc.	31

Notes

Shop orders show increase of 38½% over September, 1927; invoices show increase of 24½%.

There has been a slight advance in window glass prices.

A few electrical fittings have dropped 5%.

Copper prices are still strong and as a result there have been slight advances on brass pipe, fittings, brass sheets, rods, etc.

Corrugated boxes have been reduced approximately 10% in price.

Pig iron prices are appreciably stronger. Buffalo iron is generally $1 a ton higher than the low level.

Thomas Steel Company has reduced base price on larger sizes of high-speed steel to 45 cents per pound, thereby establishing same price as other steel suppliers.

Lumber is higher. Our sources of supply state that present prices of spruce range from $1 to $1.50 per 1,000 feet higher than the contract price we established in the early summer.

There has been formed an association of local supply houses, which is endeavoring to eliminate price cutting among the dealers. The result is likely to be slightly higher prices on many items we buy. None of the price adjustments made so far have affected us.

A. O. Hatfield
September, 1928

officer of the Brown & Sharpe Mfg. Company, the substance of which was as follows:[1]

> We propose . . . to set up a Master Cost Sheet for the purchasing department, on which are debited all items which are properly chargeable to the cost of purchasing and which are affected by departmental efficiency or inefficiency, and on which are credited all items which are properly allowable as credits against the cost of purchasing, provided they are likewise affected by departmental efficiency or inefficiency.
>
> It is necessary at once to differentiate clearly between *prices* and *cost*. Price is only one element in the cost of purchasing. Stated

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[1] Based on "The Balance Sheet of Departmental Efficiency," by Donald G. Clark, in *Methods or Yardsticks for Measuring the Efficiency and Proving the Value of the Purchasing Department*, N.A.P.A. Pamphlet No. 12, 1931, pp. 19–23.

simply and in terms of cost factors known to all companies, the cost of purchasing is composed of:

a. The price of the things bought.
b. The expense of maintaining a department to buy the things.
c. Any expense caused by errors, losses, or delays in securing them.
d. The expense of keeping and storing the things bought from the time of their receipt until they are used.

. . . .

a. Price.—It is obviously unfair to the purchasing department to debit against its account the entire price of purchased material, which would penalize the department for high commodity prices and reward it for recessions in market conditions, both of which are entirely beyond its control. We must rather debit or credit the department on the basis of the margin between the prices it pays and the average market.

To conserve clerical effort, the purchasing department, in conjunction with the management, should select those commodities bought in sufficient volume to constitute a major factor in the purchases, and should show . . . a comparison of average market and actual purchase prices. . In some cases a few records of this sort would cover fifty per cent. or more of the total purchases; in others, the commodities capable of being so recorded without undue burden would amount to only ten per cent. or less of total purchases.

. . . .

Where the purchasing department is responsible for the sale of scrap, similar records may be kept on scrap sales, except that sales below market are a debit to the departmental cost sheet, and sales above market are a credit.

There are other demonstrable savings which may be credited to the purchasing department. The adoption of substitute materials or methods is often initiated by the purchasing department and sometimes results in savings to the company beyond any possibilities of mere purchase price economies. Ordinarily, however, these cases are complicated by the participation of other departments and the uncertain extent of the savings achieved.

It is our opinion that the securing of cash discounts is not creditable to the purchasing department, because in the vast majority of cases, the cash discount terms of vendors are the same to all the world. Nor can the purchasing department fairly be credited with promptness in paying bills to take advantage of cash discounts or debited for failure to earn the discount, since the primary responsibility in this matter lies with the accounts payable or treasury department. . . .

b. Departmental Expense.—There can be no doubt as to this item on the debit side of the cost sheet, but the question may be raised as to whether there is any standard of what constitutes the purchasing department. In some concerns, the receiving department is a part of the purchasing department; in others it is not. Our attempt is not to afford comparisons between different companies. For our purpose, purchasing department expense is the expense of the department as maintained by the company in question. If the receiving department is included, its expense goes in. If not, it stays out.

It should include the following easily ascertainable items of expense:

1. Salaries and wages.
2. Travelling expense.
3. Supplies and stationery.
4. Subscriptions to periodicals, membership dues, etc.
5. Maintenance, heat and light, rent, use of equipment.
6. Telephone and telegraph.
7. Transportation charges. In some concerns all charges on purchased material are debited to the department. More often, express charges only, or excess charges over cheapest way. Either method may be used.
8. Stenography and postage.
9. Supervision. This may be estimated or omitted. (Some companies include 5, 6, 8, and 9 in a single item of departmental overhead.)

c. Errors, Losses, Delays.—Ordinarily the purchasing department has a *Loss and Error Account* (or possibly two separate accounts) to which can be charged expense caused by mistakes in ordering, wrong specifications, typographical errors in transcribing orders, goods lost in the department, etc. In some cases, the account is chargeable only with the material scrapped or lost by purchasing department fault. In others, it is chargeable with extra time spent by the factory on material erroneously specified, etc., but which could be used by the expenditure of excess labor charges. In still others, such an account will take care of extra expense caused by delays in receipt of purchased material.

There are many cases of loss and error which are not due to purchasing department fault, but which are blamable to vendors, to mutual misunderstanding, or to act of God. It is impossible to achieve any exactness in disposing of these items, but we maintain the principle that an important part of the purchasing department's duty is to minimize vendors' errors, misunderstandings, and untoward happenings generally. At any rate, such losses are certainly items in the cost of purchasing.

We propose, therefore, that the purchasing department should be responsible for a *Returned Goods Account,* to which should be debited the value of all goods returned to vendors and all claims against vendors for defective, wrong, or unsatisfactory goods. This account should be debited also with all handling and transportation expense arising from such returns. It should be credited with all credit memoranda or replacements secured by the purchasing department in such transactions.

In the absence of a provision for such an account in the cost accounting system of the company, the purchasing department should itself keep a record of returned goods with the same debits and credits mentioned above.

. . . . . .

The purchasing or receiving department should keep a record of the total number of orders received in a given period, and the number received after the specified delivery date. For each order received late, the purchasing department should be debited with a fixed amount. This amount, we believe, should be the estimated *departmental* cost for handling an order, on the theory that the company is spending a certain sum per order to maintain its purchasing department. In the case of the particular order received late, the purchasing department has failed in the function for which the company has paid it, and should be debited with the sum paid for a job it has not done.

d. Inventory Costs.—Rightly considered, the inventory of purchased materials carried by any company is nothing more than a form of insurance against purchasing department failures. The perfect purchasing department should bring into the factory every single item of material at the time it is due to start to be fabricated, every tool on the day it is to be used, every supply on the date it is needed for actual consumption. Of course no department is, or can ever be, perfect in this sense. Neither sources of supply nor transportation services are dependable to any such degree of exactitude in delivery. Moreover, no company can buy economically except in quantities that forbid immediate and complete use, at least on certain items. Therefore inventories and storage are necessary factors to assure uninterrupted operation.

The inventory of purchased materials is, therefore, a self-written insurance policy by the company to back up and supplement the purchasing department. The premium is the carrying charge on the inventory. Whatever it costs the company to carry this inventory is part of its purchasing expense, . . . [and the efficiency of the purchasing department] can be measured only by taking the inventory and its carrying charges into account. It is obvious that often a discount of ten per cent. can be secured by quantity purchase. Is it efficient purchasing to buy such a quantity if the material must go into storage, and if it will cost more than ten per cent. to carry it until it is needed? Obviously, the economy of no single purchase can be judged without considering such carrying charges. Much less can we measure departmental efficiency on all transactions without taking into account the cost of carrying the inventory of purchased materials, including

1. Interest on the investment represented by the inventory at current rates of return on invested funds.

2. Storage costs, including cost of handling into and out of storage, and the keeping of stock records. Under this item come the salaries and wages of all employees of stores and stock record departments for purchased materials, shop trucking expense to and from stores, requisi-

tioning expense, and all other separable items of expenses directly applicable to purchased material which is stored instead of going directly from the receiving department into immediate use.

3. Losses from storage, including spoilage, obsolescence, and actual losses of material.

4. Depreciation in value of inventoried goods.

It is usual to make an estimate of the total carrying charge in the form of a percentage on the value of the inventory. This will vary widely between different concerns. We have found instances of such variation from 10 to 18 per cent. in different companies. The average will certainly fall between these figures.

If we are to charge the purchasing department with obsolescence, depreciation, etc., we must in fairness allow a credit for its success in combatting these losses. Practically all purchasing departments have the duty of selling surplus, obsolete, or non-usable materials. All such salvage should be credited to the purchasing department as an offset against their debit for inventory losses. A typical Master Cost Sheet for the purchasing department is shown in the accompanying illustration, with specimen entries under the various heads. The figures used are fictitious, but have been so computed as to be reasonable.

Calculating Efficiency.—Having established a method of computing the cost of the purchasing department, it is necessary to relate that cost to the job done. It is obviously impossible to take this item of net cost as an absolute figure and have it mean anything as a measure of efficiency. It must be established in ratio with the volume of purchases, which is the best index of the size of the job done at a given cost.

The net cost of purchasing as computed above should be divided by the total value of purchases made in the period under consideration. The result will be a percentage figure which may be phrased as "what it costs the company to spend a dollar." . . .

This percentage is not a measure of purchasing efficiency; rather it is a measure of purchasing *in*efficiency. The theoretically perfect purchasing department would save over market prices enough to pay all departmental expenses; it would have no losses, errors, or delays to its debit; it would need no inventory to support it and therefore there would be no inventory carrying charges. Its percentage of efficiency, then, would be one hundred. Every item on the debit side of our Master Cost Sheet is a deduction from that one hundred per cent. of efficiency.

We therefore subtract from one hundred per cent. the percentage arrived at by relating the net cost of purchasing as shown in our Master Cost Sheet to the value of purchases made, and thus arrive at the desired figure expressing the percentage of purchasing efficiency. In the illustration used in the previous paragraphs, the percentage of efficiency would be 95.

Our formula for purchasing efficiency is, therefore, the following:

Purchasing department efficiency may be expressed by deducting from 100 per cent., the standard of perfection, that percentage of the total value

Master Cost Sheet for the Purchasing Department

DEBITS

Prices paid in excess of average market prices*			
Lumber		$ 1,122.85	
Foundry Scrap		642.91	
Flour		309.00	
Total			$ 2,074.76
Departmental Expense			
Salaries and wages		$17,143.10	
Travelling account		315.25	
Stationery, supplies, and postage		1,767.24	
Subscriptions, dues, etc.		285.00	
Rent, heat, light, equipment		3,750.00	
Telephone and telegraph		2,480.19	
Excess transportation charges over cheapest way		3,144.37	
Total			$28,885.15
Departmental Deficiency			
Losses and errors		$ 632.44	
Deficiency in returned goods account		1,127.92	
Cost of delays			
Total orders placed	29,697		
Departmental expense	$28,885.15		
Cost per order	0.9727		
2,816 orders received late, at .9727 each		2,739.12	
Total			$ 4,499.48
Expense of carrying inventory of purchased goods			
Average inventory	$362,101.72		
Estimated cost of carrying	12%		
Carrying charge on inventory			43,452.21
TOTAL DEBITS			$78,911.60

CREDITS

Savings on average market prices*		
Pig Iron	$ 1,691.28	
Coke	419.88	
Coal	2,118.36	
Linseed Oil	2,148.81	
High Speed Steel	4,656.80	
Belting	764.39	
Oils and Greases	1,621.06	
	$13,420.58	
Substitutions and savings, estimated (Accepted by management)	4,800.00	
Total		$ 18,220.58
Revenue from Salvage Sales		1,810.86
TOTAL CREDITS		$ 20,031.44
Net cost of purchasing		58,880.16
		$ 78,911.60

* These items are illustrated by use of a series of basic commodity charts furnished by the National Association of Purchasing Agents.

EFFICIENCY

Total purchases for year	$1,234,567.89
Total purchases divided into net cost of purchasing ($58,880.16)	0.0477
Standard of perfection	100.00%
Minus percentage of purchasing	4.77
Percentage of Purchasing Department Efficiency	95.23%

of goods purchased in the period under consideration, which represents the cost of the department to the company for the same period, including in that cost departmental expense, expense incurred by all departmental failures and shortcomings, and the expense of carrying the inventory of purchased goods, less any net savings over market prices which may be proved, and less net returns from salvage sales.

It will be necessary to have a certain back-log of data as a prerequisite to setting up any definite standards of purchasing efficiency. . . . We recommend . . . that a full year's experience be gathered and thoughtfully analyzed before any standards are set.

Nor should the department be judged solely on the basis of improvement over present performance. . . . We do not believe in any theory that would reward the extremely inefficient department for improvement over a present low record of performance, and would fail to recognize an already efficient department that maintained its high record.

. . . Any purchasing department should be required, as a minimum, to make net, demonstrable savings sufficient to offset all departmental deficiencies. Otherwise, why have a purchasing department at all?

. . . . . .

We expressly disclaim the intention to provide for comparison of purchasing efficiency between concerns. . . .

83. JAMES DEVERAUX COMPANY

PURCHASING PROCEDURE AND CONTROL

James Deveraux Company manufactured waterproof footwear, including approximately 150 different styles of rubbers and overshoes; canvas footwear in about 40 styles; and sports shoes and sandals in about 50 styles, many of which were of novelty type. The company's products were sold directly to independent retailers. Total annual sales volume averaged approximately $9,000,000.

Between July and December the company's manufacturing facilities were devoted primarily to the production of rubbers and overshoes. From January to June, emphasis was on the production of canvas footwear and sports shoes. Several months prior to the beginning of each of these two seasons, the president, sales manager, factory manager, and designer held a committee meeting to decide what styles should be offered to retailers in the ensuing season. Standard costs were computed for all definitely accepted styles, and selling prices were set. During the next several weeks, the company's salesmen visited their retail customers to get reactions concerning the proposed styles. On the basis of these visits the salesmen estimated their sales of each style for the ensuing season. After the individual estimates were assembled, the comptroller's office calculated the season's probable total sales and the expected monthly distribution of sales by individual styles, expressed both in number of pairs and in dollar volume. This estimate was presented for approval to a committee composed of the president, comptroller, and sales manager. Generally these figures were fairly accurate in total, although sometimes quite inaccurate for individual styles. Upon some occasions, however, total sales varied from sales estimates because of economic or weather conditions.

After the sales budget had been approved, it was used as the basis for the production budget, which gave the same itemized information translated into production figures. The president, comptroller, sales manager, and factory manager were responsible for the approval of the production budget.

A copy of the approved production budget was sent to the planning department, and from it were determined the required amounts of all raw materials of more than minor importance, which amounted to 95% of the total estimated requirements of raw material. The material estimates were reduced to a day-to-day basis for the entire period budgeted. From the records of daily needs a statement was prepared indicating the cumulative requirements of these items throughout the season.

With the estimates of material requirements as a guide, the accounting department budgeted the purchase of all major materials. Recommendations as to when such purchases should be made, how much should be purchased, and when delivery should be required were presented by the accounting department to a committee composed of the president, comptroller, sales manager, factory manager, and purchasing officer. The committee discussed the recommendations and, if necessary, modified them before approving the purchase program. Approximately 70% of the company's purchases of raw materials were budgeted in this manner. The purchasing officer was then made responsible for carrying out the approved program.

The purchase of the less important raw materials included in the planning department's estimates was left to the discretion of the purchasing officer, provided that he followed the company's general policies in their procurement. On these purchases, which represented about 25% of the company's total raw material requirements, the purchasing officer was responsible for delivery of acceptable material in time to avoid production delays. Items of minor importance and materials usable only in highly styled models, which together represented 5% of total raw material requirements, were purchased by the purchasing officer only upon requisition from the factory.

All the company's products were manufactured by practically the same procedure, which may be outlined as follows:

1. The cotton fabric, which served as a base for the footwear, was either impregnated or coated with rubber, pyroxylin, or some other filler.
2. The impregnated fabric was cut to proper size.
3. All parts of the uppers were stitched together.
4. The heel was attached to the sole.
5. Uppers and lowers were assembled to make the final product.

The basic raw materials used by James Deveraux Company were rubber, cotton fabric, and chemicals. The amount of raw rubber and chemicals required depended upon total volume of production rather than upon production of individual styles. The amount of each fabric used by the company, however, depended upon the extent to which it was used in different styles.

Whenever feasible, it was the company's policy to place contracts for its entire season's requirements of individual raw materials. When buying on such a basis, the purchasing officer selected several reliable sources and sent to each a request for bids on the total season's requirements, indicating the specifications for the material, the amount of each consignment, and the exact date on which it was due. After bids had been received, he negotiated with the sources making the best preliminary offers. Each season the contract for the company's raw rubber requirements was placed with some one dealer in New York City. On the other hand, cotton fabrics were purchased on a seasonal contract basis from 15 to 20 mills; chemicals were contracted for from three or four companies.

Whereas some contracts contained blanket price protection clauses offering the buyer the benefit of any subsequent price decline, others established either a single price on all deliveries or different prices for individual deliveries. The price variations that were set up under the latter type of contract reflected the general price changes that the purchasing officer and the source of supply believed would occur between the date of signing the contract and each delivery date. As between the two types of contract not offering price protection clauses, the James Deveraux Company favored arrangements for price variations among deliveries because of the belief that by this method the company obtained material at lower total costs. There was no logical reason for these better results, but sources of supply appeared to entertain a psychological bias in favor of the variation method.

The company's policy of purchasing whenever feasible by the seasonal contract method was based to some extent upon the existence of trade practices favorable to such a policy, particularly with reference to fabrics and chemicals. By signing contracts for its entire seasonal needs the company often could obtain substantial quantity discounts. In addition, the company was thereby better able to protect its sources of supply and to avoid losses resulting from possible shortages of required materials. While this last factor had not been important in 1929–1935, it was becoming more important in 1936; and there was evidence that, in future years, companies that were not protected by forward contracts would find difficulty in getting materials delivered in time for production. Another advantage of the seasonal contract was that it fixed the material costs for the company's products at a known level for an entire season.

Generally the purchase contracts did not contain a clause allowing cancellation of any part of the order. In instances when the company purchased more than one type of fabric from the same source, some contracts permitted a limited substitution of one type for another. When the company's raw material requirements were overestimated, therefore, the contract method resulted in an excess supply of materials at the end of a season. At such times, however, it was possible on the average to break even on the resale of these materials.

The seasonal contract method was not adaptable to the procurement of materials used only in small quantities. On individual purchases of such materials, when more than $100 was involved, the purchasing officer was required to send price inquiry sheets to some of the sources of supply that he considered to be reliable. These price inquiry sheets stated the amount to be purchased, delivery terms, and product specifications. When replies were received from all sources that had been invited to bid, the lowest offer was usually accepted.

In addition to buying raw materials, the purchasing officer was also responsible for the purchase of materials needed for equipment and building improvement. When improvements of this nature were proposed, the purchasing officer estimated the cost of materials required, and the factory engineering department estimated the cost of labor and overhead. These cost estimates were incorporated in improvement proposals which were then submitted to the factory manager and comptroller for approval. If they were approved, the purchasing officer arranged for the procurement of the necessary materials.

All materials delivered to the company were held in the receiving department awaiting inspection. Items were inspected either in the company's laboratory by the sample method, or in the receiving department by inspectors on the staff of the factory manager. Materials did not enter storage until they were approved by the inspectors or laboratory. After the material had been accepted, the purchasing officer was no longer responsible for it. Thereafter any losses occurring because of spoilage or failure to meet specifications were charged to the factory production accounts.

The inspectors were responsible only to the factory manager. This separation of inspection from purchasing was believed necessary in order to prevent the acceptance of material that did not wholly meet specifications.

With the exception of material purchased for improvement accounts, all items as received were posted to the proper inventory accounts at standard prices, which were set up prior to the beginning of each production season by a committee composed of the president, comptroller, sales manager, production manager, and purchasing officer. The difference between actual cost and standard cost on each shipment was posted to a purchase variation account; there was one such account for each major raw material.

When a shipment was rejected because it did not come up to specifications and, therefore, had to be replaced, the purchasing officer was still held responsible for having satisfactory material on hand in time to meet production needs. If production was held up either because materials were rejected or because they did not originally arrive on time, the purchasing department was charged with the resulting loss of time and the overhead cost involved. This practice was based on the theory that the purchasing officer had selected the sources of supply and should have assured himself of their reliability before ordering.

If material was rejected and not returnable, either because the terms of the contract did not provide for return or because the purchasing officer's failure to specify proper methods of shipment had resulted in spoilage, the purchasing department was charged or credited with the results of the resale. Upon some occasions when rejected material had to be paid for, the purchasing officer was able to arrange for its purchase by the production departments at reduced rates. This arrangement, of course, was possible only when a substantial part of the material was usable for its original purpose or when it could be utilized in lower-grade products. In such instances the purchasing department absorbed the differences between the actual cost and the price at which the material was accepted by the production departments.

When the actual production volume was less than the seasonal estimate and the company therefore had an oversupply of material on hand, the purchasing officer was sometimes instructed to make arrangements for its resale. Unless the overage had resulted from the purchasing officer's buying more than the budget required, the profit or loss on resale was entered in the factory production account. If, on the other hand, the overage occurred because the purchasing officer had exceeded his budget, his department was either charged or credited with the result. It was ordinarily expected, however, that the purchasing officer would not exceed his budget without authorization.

All important charges against the purchasing department for losses resulting from delayed delivery, rejection, or forced acceptance of below-standard materials were immediately called to the attention of the assistant comptroller by the recording clerk in the accounting department. At the end of each month the total net loss or gain figure for such transactions was also examined by the assistant comptroller.

All important items entered in the individual purchase variation accounts, as well as net monthly figures, were called to the attention of the assistant comptroller. He endeavored to determine the cause of the variations—whether favorable or unfavorable terms arranged by the purchasing officer, poor setting of standards, or general price trends. Because all three of these factors were ordinarily present to some extent in each instance when a variation occurred, it was somewhat difficult for the assistant comptroller to decide which of the possible causes was primarily responsible for the result.

In order to make it easier to judge the extent to which each possible cause contributed to individual variations, the assistant comptroller was considering a change in the procedure for posting variations to the variation accounts. Under the terms of his proposal, the use of standard costs set prior to the beginning of each season was to be continued in charging the material to stores and in charging material from stores to the factory departments. For the computation of variations, however, he proposed to modify the original standard costs whenever important changes in price levels occurred. The posting of differences between original standard costs and actual costs was to be made in two steps: (1) to charge to a price trend variation account, established for each principal raw material, the difference between the original standard price and the new standard price, and (2) to post to the corresponding raw material variation account the difference between the new standard cost and the actual cost. The assistant comptroller believed that the raw material variation accounts would then more nearly reflect the ability of the purchasing officer and show the extent to which he was obtaining or failing to obtain prompt delivery of satisfactory materials at favorable prices and terms. The assistant comptroller had not tried out this proposed change, however, as he was not certain of its value in actual practice.

Material accepted for an improvement account was charged into stores at actual cost. A record was kept of all material purchased for each improvement account, and actual costs were compared with previously estimated costs at the time of posting. Important variations were reported immediately to the assistant comptroller, who investigated to discover the causes. At the end of each month the assistant comptroller received a net variation figure for all materials purchased for improvement accounts. It was normally expected that gains on this account would about equal losses.

Copies of all purchase contracts and orders placed by the purchasing officer were sent immediately to the accounting office, where they were examined each day by the assistant comptroller. The latter watched for variations from the usual routine of purchasing. For example, when large purchases were not made on a contract basis or when bids were not taken from a sufficient number of firms, he inquired as to the reason. He also examined individual purchase orders to determine whether or not the materials purchased were required according to the budget.

At irregular intervals the assistant comptroller assigned clerks from the accounting department to visit the purchasing department to check the routine there. These visits were not previously announced to the purchasing officer. The clerks from the accounting department sometimes stayed for only an hour or two listening to what went on in the purchasing department. At other times they requested that they be shown all records of correspondence and contracts written for several weeks previously. They examined these records carefully to determine whether proper care was being taken in arranging purchases. They checked the sources from which bids had been asked in order to make sure that representative bids were received. They checked the interrelations of the firms invited to bid in order to make sure that there was no opportunity for comparison of bids among these firms before the submission of quotations to James Deveraux Company.

The expenses of the purchasing department were budgeted in two groups. The first of these, which included only salaries, was expected to be adhered to exactly. The only possible opportunity for variation in this account occurred when some employee of the department resigned. All changes in salary were initiated by executives outside the purchasing department. The second budget group included allowances for incidental expenses, including supplies and traveling expenses. Although the purchasing officer was expected to adhere in general to all budget figures, he had some discretion over expenses in the second group. The traveling expenses of men in his department, however, were checked very carefully by the assistant comptroller to determine whether each trip justified its cost by making possible savings in the prices of materials purchased. If it could not be shown conclusively that lower prices were obtained by the trip than could have been obtained by correspondence, the purchasing officer was so informed.

For purposes of purchase and production control the stock room inventory was carried at standard costs. For accounting purposes, however, it was necessary to have the inventory valued at cost or market, whichever was lower, when balance sheets were being made up at the end of each year. At such times, physical inventories were taken. Market values were assigned to each raw material in stock on the basis of current quotations or of the latest invoices. Cost figures were determined by applying the percentage of variation between actual and standard costs for the year just ended to the standard cost of inventory in each raw material classification. These variation percentages were obtained from the variation records kept separately for each important raw material classification. The assistant comptroller compared the differences between the final inventory values at standard costs and at market prices for each raw material classification with the purchase variation amounts and percentages for the period. By this comparison he was able to judge in still another manner the relative efficiency of the purchasing officer in the purchase of each type of material used by the company.

84. DETERMINATION OF THE COST OF PURCHASING

How to measure the cost of purchasing is a problem which is constantly recurring in one form or another. Some appreciation of what the development of an acceptable plan for cost analysis would mean can be secured by observing what a knowledge of marketing costs means to a sales manager or of manufacturing costs to a production manager. It must be apparent to every student of business that without the information provided by adequate cost data any executive responsible for either sales or production would be at a loss to know how to proceed. Argument is no longer necessary to substantiate the fundamental importance of such data in these fields.

Little has been accomplished, however, by either cost accountants or purchasing officers toward reaching an agreement as to a sound method of measuring purchasing costs. Many believe it is impossible to devise a method sufficiently accurate to be of value. A part of the difficulty is due to the widely divergent conditions under which the purchasing function is performed. Another is to be found in the absence of any standardized method of accounting for purchasing expenditures.

Many students of purchasing, however, believe that these difficulties are not insuperable, and various suggestions have been made from time to time for overcoming them. The following constitutes one such suggestion:

The total cost of purchasing should be stated as an absolute dollar figure, which should then be translated into a percentage of the total production cost. Each component part of the total purchasing cost should likewise be converted into terms of percentage of the same base.

An alternative basis for conversion might be to compare the total cost of purchasing (and of its component parts) with the total dollar volume of materials purchased.

Comment.—For the purpose of this discussion, it is assumed that the purchase of machinery, major equipment, and such items as office supplies, used in all phases of company operation (and hence not entering directly into the cost of production), are excluded. To achieve the objective sought by the general project under review (namely, the determination of purchasing costs for purposes of procurement policy control and the measurement of procurement efficiency), no consideration need be given to the allocation of general company overhead (taxes, interest on indebtedness, etc.). The primary reason for this exclusion is to be found in the fact that such items are beyond the purchasing officer's control and hence can in no direct sense influence either his policies or his personal efficiency.

A question may arise as to any justification for the use of the total production cost as a base since the total production cost includes the purchasing cost. However, no greater error is thereby introduced than prevails in the common practice of measuring marketing expense on a basis of total dollar volume of sales, which includes the cost of merchandise sold. Furthermore, so long as the items included in the total production cost (including that of purchasing) are known, no harm is done.

The use of the alternative base (total dollar volume of materials purchased) raises the question as to whether the emphasis is properly placed, in view of the fact that the controlling purpose to be served is that of keeping the purchasing cost down as compared with total production cost.

An objection may also be raised to the use of this base on the ground that where it is used an increase in the amount of material bought reduces the percentage of purchasing cost, and that a lowering of the general price level increases the percentage of such cost (and vice versa). Either of these conditions would to some extent affect the validity of any comparisons that might be drawn. With respect to the former, it may be noted that a somewhat analogous condition prevails in comparing those industries in which the proportion of fabricating or processing costs is normally high in relation to material costs, with industries in which material costs are higher in proportion to fabricating or processing costs. This is not serious where comparisons are made between similar industries or within the same company from year to year.

With respect to the effect of changes in the price level, it may be noted that, while the dollar value of purchases is likely to vary to some degree directly with the price level, a partially counteracting element is introduced by the fact that the volume of purchase, and hence the size and activity of the department, is also likely to vary in the same direction. Furthermore, an allowance can be made for the conditions referred to in explaining the variations in purchasing cost. *An increase in purchasing cost at one time as compared with another or of one company as compared with another should not be interpreted as in and of itself adverse criticism of policy or efficiency.*

The following classification of purchasing costs is suggested as a basis for further discussion of method:

I. Purchasing Administrative Costs

This would include such items as:

A. Salaries paid to purchasing officer and assistant buyers.
B. Clerical expense.
C. Traveling expense.
D. Office expense, including rent, heat, and light.
E. Miscellaneous, including such items as subscriptions, dues, and convention expenses.

II. Cost of Materials and Supplies Purchased

A method of treatment worthy of serious consideration is that, since the project under discussion is designed to measure purchasing *costs*, a comparison be made between the market price of supplies and materials bought on the one hand and the amounts over or below this price actually paid on the other. When supplies are bought at more than market price, the excess should be added to the cost of purchasing. If materials are bought at less than market, a deduction from the cost of purchasing should be made. If, however, a purchasing department buys at market, it is after all doing the thing that would normally be expected. Obviously, it would be unfair to charge against the purchasing department as part of its cost the total amount paid for materials and supplies unless such materials were used by the purchasing department itself.

A question arises as to whether the market price shall be that prevailing at the time materials are purchased or that prevailing at the time such materials are used. It is believed that the latter is preferable since the real gains derived by efficient purchasing become effective only when materials pass into production. If, therefore, the market price of any given material at the time that material passes into production is used as the base, and debits or credits to purchasing cost are made from this standard, a true picture is derived.

Comment.—It is well to recognize that some difficulties may arise in determining the *market price*. Without entering into a discussion of this problem here, it is believed that in most instances it is possible to name a price for any given grade of a particular material on a particular day with sufficient accuracy to serve all practical purposes. A real difficulty does develop where a market price for a finished product is not available, as is the case with certain special-order material. One method of procedure would be to estimate a fair market price on the basis of known costs of the materials or parts entering into the item in question and adding an amount to cover administrative, processing, and selling costs. This independent estimate of the fair price could then be compared with the actual price paid. Another procedure might be to disregard entirely, as a part of the purchasing cost, the cost of such items, though not to disregard the cost of obtaining the materials. The latter, however, would be reflected in the *Purchasing Administrative Cost*. Such material is very often bought on a basis of bids, and the only method of making any comparison in such cases would be as between bids. Obviously, this would be unfair. Since no comparison with market prices is possible, it is suggested, on items where no market price exists, the item be disregarded.

A question may also be raised as to whether or not the recommended procedure provides an incentive to speculative buying. Regardless of the method of measuring costs or efficiency, the incentive to speculate is always present. The procedure recommended has advantages over some others. The results of speculative purchasing are distinctly set aside where they can be watched; this is believed to be sound procedure. Thus the Committee on Elimination of Waste in Industry of the Federated American Engineering Societies has stated:

"It is therefore recommended:

1. That raw material be charged at current prices.
2. That use be made of a 'material adjustment account' for raw materials.

"If the first recommendation is adopted, the advantage from speculative buying is removed. Variations between the actual cost of material and the cost charged at current prices may be adjusted by means of the account named in the second recommendation.

"Into the 'material adjustment account' is charged the difference between the actual and current material costs. This practice is particularly desirable for pig iron, scrap iron, coal, steel products, coke, rubber, lumber, cotton, wool, and other materials of a staple nature. The account so established would exhibit the profit and loss as between the purchase price of material and the price which is charged into the cost. For example, suppose pig iron to be purchased at $35 a ton and suppose the market later to drop to $30. The cost records would be charged at this latter rate of $30 covering the tonnage actually used, and the 'material adjustment account' would be credited with the same figure. A second entry, however, would credit the inventory account, at the actual cost of $35, for the tonnage so used, with a corresponding charge to the 'material adjustment account,' the difference representing the loss on the material so used. The cost would then be figured on the basis of the normal condition which existed at the time the material was used. The difference would be carried to profit and loss at the end of the year."[1]

There is also a difficulty encountered where the markets are so demoralized as to give no commonly recognized market price. Even under such circumstances there is a nominal price which, while not exact, is sufficiently so to afford a suitable standard for all practical purposes.

The *Cost of Materials and Supplies Purchased* obviously will be lowered when purchases are made in sufficient quantities to warrant obtaining a quantity discount. It may be noted that there will be some increase in cost under *Storage and Warehouse Expense* as a result of the purchase of such larger quantities unless the materials move directly into production.

III. Storage and Warehouse Expense

This would include such items as:

A. Interest on goods in stores.

B. Storage expense, including rent, insurance, taxes, and labor.

C. Losses through spoilage, obsolescence, theft, and physical depreciation.

D. Inspection.

Comment 1.—Several attempts have been made to use *turnover* as a factor in purchasing cost. Turnover, however, is a *rate* rather than an expense. It is an indicator of a condition and not a cost in itself. It is a ratio between stores and purchases and varies normally and justifiably as between various types of industries and even within the same industry. "In general, inventory values should be expressed in terms of ratios to the value of material actually used in production or estimated for use on the basis of plan schedule, if actual differs from the original plan."[1] This use of turnover as an indicator of a condition is analogous to its use within the field of marketing. Its computation as a figure separate from any actual cost figure is a comparatively simple matter.

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[1] *Waste in Industry* (New York, McGraw-Hill Book Company, Inc., 1921), pp. 394–395.

Comment 2.—The question may arise as to whether or not this item of *Storage and Warehouse Expense* should be included for those companies whose organization provides for a separation of storeskeeping from purchasing. There is ample reason for so doing, especially since the purchasing and stores departments must work very closely together even when they are not actually under one head. (*a*) The "*inventory always should be*, at least indirectly, *under purchasing department control.* The time required for delivery governs the quantities necessary to carry of any material. The quantities which must be bought for price considerations are known to the purchasing department and are either made effective by that department directly or are passed along to the inventory control department as the basis for ordering quantities." (*b*) The real cost of the *purchasing function*, aside from any question of organization as such, "can be measured only by taking the inventory and its carrying charges into account. . . . The economy of no single purchase can be judged without considering such carrying charges."

IV. Losses Due to Errors and Delays

A. There are four types of errors:

1. Those which are largely clerical in their nature and are corrected within the office itself. No particular consideration need be given to the cost of such errors since they would be reflected in the administrative costs mentioned above.

2. Errors which result from returned goods. These may or may not be self-corrective. If the goods are returned at no cost to the buyer whatsoever and with no delays in operations resulting therefrom, no harm is done except an increase in administrative expense. If goods are returned at some expense to the buyer because he has to pay the freight or because the supplier makes a charge for reconditioning the goods or for some other reason fails to give the purchaser full credit, then these costs should be charged against the purchasing department.

3. Goods which are not returned and cannot be used in the plant and therefore have to be resold. In such cases, it is believed that any profit resulting from such sales should not be credited to the department, since the transaction was occasioned by an error on the part of the purchasing department and also because this method of crediting the profit might become an incentive to engage deliberately in such transactions. On the other hand, any loss resulting to the company from these resale transactions should be charged to the department as at least a partial deterrent to a repetition of the mistake.

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[1] William H. Carney, "Measuring the Efficiency of the Purchasing Department," in N.A.P.A. Pamphlet No. 12, 1931, p. 6.

4. Materials which can be used in the plant at some additional expense. The cost of this additional expense should be charged against the purchasing department since (*a*) it is believed that an adequate system of cost accounting will reveal roughly the amount of the additional expense, and (*b*) it is not a mistake in the production department.

B. Delays resulting from the failure of materials to arrive on time increase the cost of production and may be due to the inefficiency of the purchasing department. If it be accepted that it is the responsibility of the purchasing department to get materials to the plant on time for their use, then it is difficult to understand how this responsibility can be evaded even though the apparent cause of the late ordering is believed to lie outside the purchasing department. If these delays are due to faulty organization or to lack of courage on the part of the purchasing officer in insisting upon timely requisitioning, these results should be expected to show up in the final cost figure.

The usual difficulties which arise in attempting to measure these delays are due to a hesitancy to charge the purchasing department with a total cost of such losses; yet to charge it with anything less is arbitrary.

The thought here is that, since any adequate system of industrial accounting makes it possible through the use of standard costs to estimate the cost of a complete or partial shutdown of production departments and since the responsibility is one of the purchasing department, the entire cost be charged to it. If thus set by itself, it would be carefully watched by the purchasing officer and by the management. Although the amount thus charged may at times loom very large in terms of percentage to total annual production costs, it will not be disproportionate to its true significance. It has been pointed out that a delay in delivery is sometimes expensive and at other times costs the plant nothing. The only feasible procedure is to charge what and when it costs.

The foregoing four classifications cover, it is believed, the major items of cost. It still remains to give attention to two other activities closely associated with purchasing. The first relates to the sale of *scrap and salvage*. The question may be raised as to whether or not this properly constitutes a function of the purchasing department at all. If it does not, then clearly there is sound reason for segregating it from the other activities of the department. In either case, however, it is an essentially different type of transaction from the others of the department in that it constitutes a sale rather than a purchase.

It may be difficult for many companies to segregate the additional administrative expense of handling scrap and salvage. When this is the case, the cost of the additional administrative expense item should be disregarded entirely. No great harm is done thereby if the item of scrap and salvage is considered a supplementary item as is here recommended.

Theoretically, perhaps it should be said that if scrap and salvage items are sold at a profit the purchasing department should be credited with the amount of the profit, while if sold at a loss an additional charge should accrue. In the case of a good deal of material this is probably possible. In many cases, however, there is no market price with which comparisons can be made. Two methods of procedure suggest themselves. One is to credit the purchasing department with any profits made from the sale of scrap and salvaged items after having given full consideration to the costs resulting from the preparation, classification, etc., of the material. The other alternative is to consider that the disposition of scrap and salvage is not a part of the purchasing function but is performed for other departments or for the company as a service, in which case a brokerage fee might well be charged those departments for which the service is rendered and credited to the purchasing department.

The last major item to consider is the matter of *research activities* conducted by the purchasing department. (If not so conducted, the charge made, if any, against the purchasing department for this service should be added.) This again is considered as a supplementary factor for two reasons: one, that all companies do not have a research division attached to the purchasing department, and the other, that the benefits resulting from its activities are practically impossible of measurement. It is believed unwise, therefore, to incorporate it as one of the four major costs of purchasing, although equally unwise to disregard it entirely. The basis suggested is to count it as a cost additional to the others although segregated from them and with no compensating figure.

In short, the procedure suggested is that *to Purchasing Administrative Costs be added Storage and Warehouse Expense, Cost of Materials and Supplies Purchased* (as explained), *and Losses Due to Errors and Delays. Summarize these four items; credit the department with the profits or brokerage fee resulting from the sale of scrap and salvage; and to the result add the cost of research activities. All these items should be reduced to a percentage of the total production cost* (or of the cost of the materials bought if desired).[1]

Various comments were made with reference to the foregoing proposal, of which the following are illustrative:

(1)

If, as suggested under Sec. II, materials are priced into expenses at market the day of use, and the cost of purchasing is charged or credited with the difference between actual cost and market when used, it is possible that Purchasing Cost might become a negative quantity, which would mean that the value of the purchasing officer was very positive. Apparently the method is suggested to avoid attempting to evaluate such intangibles as goodwill built up by the purchasing officer, and to exclude (*a*) the savings made by suggested substitutions of materials better suited for the purpose, and (*b*) savings made on construction material, plant equipment, and operating supplies.

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[1] "Determination of Purchasing Costs," *The Executive Purchaser*, October, 1933.

We can ignore the question of goodwill on two bases: (*a*) that it is part of a purchasing officer's job to build goodwill by courteous treatment and fair dealing, and management should insist that he perform that part of his duty; (*b*) that the goodwill factor is probably measured and credited to the purchasing department in price and delivery service obtained, less errors and shutdowns.

Purchasing department suggestions should be valued after investigation and not much credit given where the purchasing officer merely acts as the channel through which an alert salesman passes a new thought to the company. On the other hand, where the purchasing officer makes a suggestion due to actual study and thought, he should be given a *special* bonus or prize for having done work in the Research Department on his own time.

From the foregoing, it may be noted that these items need not be avoided; perhaps it might be better to attack them and put them in their places.

In new and rapidly growing businesses, the purchase of plant materials and equipment has a very definite place in the purchasing officer's work. It is true that to include this in the Total Dollar Purchases might materially affect this measuring device, and that may be the reason for the desire to exclude this factor. Rather than ignore the factor, why could it not be recognized and an expense adjustment be made for it? In a large organization, the equivalent of a man's full time may be devoted to this work. Comparing two companies similar in every way except that one is static and the other growing rapidly, unless one made allowance for this factor, the statistics would wrongly favor the static company's purchasing expense.

Little need be said about ordinary administrative costs. It is easy enough to arrive at unit costs on these items for comparison.

One thing I do not find mentioned, which is at the present time perhaps the principal measuring rod being applied to purchasing, is the Budget.

In businesses such as the feed business, materials are a large percentage of total costs. Most grain is purchased on exchanges and very little direct from farmers. The price of grain fluctuates rapidly during the day. Each purchase or sale sets a new market price, so it is impossible to say that you bought at a price over or under the market. You may buy under the average market. Fluctuations in price between seasons and between years are, sometimes, great—as radical as from $20 to $40 per ton, or 100% increase, in cost. In the grain pit, a few finger signals will buy a hundred thousand bushels or one thousand bushels. Government grades insure getting what you buy. You can buy actual grain and use large elevators with their attendant fixed charges, or you can buy futures and operate with very little storage capacity, fixed charges, etc. The foregoing will indicate why the feed business could not consider "dollar cost of materials" or "total dollar cost of production" a very good measuring rod to apply to purchasing costs. The foregoing will also indicate the difficulty of showing a profit or loss due to purchasing which is not speculative.

There is considerable question as to whether speculative profits or losses belong to the purchasing department, or to the general management or financial management group. In fact, in all businesses where materials are the major part of costs, it is difficult to divorce management costs from purchasing costs. The purchasing function is nearly always invaded by management.

So long as grain does not get in an import position, its production is limited to harvest time. Its natural tendency is to be cheapest at harvest and increasingly dearer as storage charges are added. Therefore, in comparing price paid with current market at time of use to arrive at purchasing profit or loss, you run into storage, investment, insurance, moisture shrinkages, spoilages, etc., over much of which the purchasing function has no control. There is another difficulty met with when you take the difference between material cost and its price the date of use as a part of purchasing cost; that is, some things must be bought approximately on an annual basis because of natural difficulties, such as the winter closing of the Great Lakes to iron ore shipments. Here the purchasing officer is forced by nature to buy more than current needs; and profits from subsequent market fluctuations, such as are occasioned in steel by the railroads being in or out of the market, do not reflect purchasing ability or cost.

Perhaps something should be said about the necessity for standard specifications and goods inspection; otherwise, apparent savings on purchases might be due to poorer materials. Specifications and inspection are also necessary to settle whether manufacturing spoilage is due to the material or its handling.

One might suggest, as an alternative method to use where dollar value is not a stable measuring device because of severe market fluctuations in material values, that purchasing be measured by the number of units manufactured. Where the factory makes a diversified line, a decimal scale value could be worked out for each kind of unit, thus reducing all to a common denominator.

—Comptroller of one of the
largest flour and feed mills in
the Middle West.

(2)

It does not seem reasonable that the efficiency of the purchasing officer should be judged by a comparison between the cost of raw material and the market price regardless of whether the market price is considered at the time of purchase or when the materials go into process. This statement still holds true irrespective of whether or not an attempt is made to allocate to the procurement cost the cost of shut-down time due to lack of material and other similar items which are suggested. Experience indicates that there are many reasons why this is so.

a. In the first place, the postulate upon which the principle of control is founded, namely, that the lowest cost is the most efficient, does not always stand up in actual practice. Something more than just the basic material itself is paid for every time a purchase contract is made and no definite price can be set upon these other values. In other words, the intangible element of reliability and service must be taken into consideration even if a parity in quality between different vendors' commodities is assumed.

Our materials are scheduled and routed very closely to be consumed at various points in the country at definite times. It would do little good to charge the purchasing officer with the cost of lost time in case an unreliable vendor slipped up. It is doubtful anyway in a manufacturing concern of any great size if a reasonable value could be placed upon a loss due to lack of material. The task alone of deciding what business had been lost and how much had simply been deferred by the shutdown would be impossible. That the desirability of employing a good vendor often offsets the advantage of a lower price is definitely known at times. There is, however, no scientific measure of which is best in some cases, a lower price or a more reliable vendor. The choice will perhaps always be a matter of executive judgment.

There are services of another sort offered by our vendors which cannot be evaluated in dollars and cents. It is not unusual for our suppliers to develop special materials for our exclusive use or for some peculiar need in our production. There could be no comparison between our cost and any ascertainable "market price" on such goods. The fact that the costs were higher for these than the market price is for some standard items would mean nothing in judging the purchasing officer's ability. The greater utility or sales appeal of the specialized article might way offset any differential between our cost and the market price of a substitute.

b. The huge quantity of material consumed by a large corporation necessarily affects the purchasing policy and makes any comparison between market price and cost invalid as a check upon the purchasing officer's efficiency. Quantity discounts would upset the comparison somewhat, but they are not the chief factor to be considered. To insure the proper supply of various commodities, it is practically necessary to reserve the complete mill capacity or at least a definite amount of the equipment of the vendor. In other words, the goods must be contracted for in advance in order to maintain uniform quality in the quantities desired.

Open market purchases cannot always be made satisfactorily, and even any great amount of shifting from one vendor to another is apt to be a poor policy in the long run. Large orders in many cases can make or break the source of supply. A "going concern" must realize the mutual advantages of sound contracts with vendors. It probably is good policy in some cases, therefore, to allow vendors a fair margin of profit and to keep them upon a sound financial basis so that later on there will always be a constant supply of reliable material. Any comparison of cost with the market price again would reveal nothing concerning the purchasing officer's ability.

On the surface, a scheme such as the one outlined would be applicable to the purchase of hardwoods. Experience, however, shows that it would be of little or no value to a very large consumer. Size alone, irrespective of certain other problems, may make the market price an unreliable guide to the value of the purchasing officer to a business. Since lumber is a natural product, its price is highly dependent upon the relation of supply and demand. There is therefore a great deal of difference between buying say a thousand feet and perhaps over a million feet of it. Consequently in such a market the very placing of orders by the chief consumers "makes the market." The relation between cost and a quoted market price means nothing under such conditions.

Even if the quantity element did not enter the lumber purchasing problem, it is doubtful if any formula such as is mentioned in your paper would prove or disprove efficiency in purchasing hardwoods. Although lumber of this type is graded and there is a lumber market of a sort, the price quotations mean next to nothing. No grading could be fine enough to make price quotations reliable. Each and every lot varies in quality in many respects. For this reason the individual supplier's reputation counts for a great deal in purchasing; the exact district from which the timber is cut means a lot to the expert lumber man; and the element of freight rates renders the market quotation unusable. Each lot purchased in itself is a matter of "horse trading," a knowledge of the market, and common sense, all elements which cannot be reduced to a mathematical formula.

So far reasons have been given only as to why it is impossible in some cases to measure the expertness of the actual purchase of materials and nothing has been said of cost of procuring the materials, that is, the costs incurred in obtaining the goods. It seems, in the first place, that it is rather foolish to check the purchasing officer for the operating expenditures of his office, when those costs are only an infinitesimal amount of what he might make or lose for the company by using poor judgment in one single purchase agreement. Second, without in the least being able to judge the value of his department's service to the company, it is difficult to set up any standard of what he should spend.

Two standards are mentioned which might be used in determining his efficiency in procuring materials (one of the component parts of total cost of purchasing), namely, (1) either the ratio between an absolute dollar cost and the total production cost, or (2) a comparison between the total purchasing cost and the total dollar value of materials purchased. It must be realized that a large part of the purchasing cost is of a fixed or nonvariable nature regardless of the volume of goods produced or purchased. In other words, either total production cost or total value of the materials purchased might increase tremendously over a period of either a month or a year and yet a large amount of the procuring cost might remain constant—to wit, salaries, clerical expense, office expense, etc. Obviously, without any real increase in purchasing efficiency, the index, or ratio, of purchasing ability might increase or decrease within wide bounds.

Another valid objection of the ratio idea of judging purchasing ability may be seen in the following example. Suppose our buyer were given a sample of trim material to procure. Now within reason he might obtain a fabric selling for $3.00 a yard, or with further experiment in collaboration with a vendor he might be able to reduce this price to $2.50 a yard and still obtain a cloth entirely satisfactory. It is true that he would be foolish not to take the $2.50 material and yet, if he did, his ratio to either cost of production or total dollar value of goods purchased would be higher than if he purchased the higher priced fabrics. In other words, the more efficient he is, the lower rating he will obtain.

—Chief accountant of one of
the largest automobile manufacturing companies.

(3)

I don't know what to say about this basis of cost on a dollar of purchase, but I do know that in our company, which is a very large one, it is a fact that many times the cost of purchasing $10,000 worth of a certain material is not any more than purchasing $5,000 worth of another kind of material. Has any consideration been given to figuring this on a basis of the number of orders placed?

It seems to me that there will be considerable clerical work involved in keeping a record of material purchased at the purchased price and also at the market price; in other words, quantities of material may be purchased at one time, and a portion remains in the storeroom a considerable time before being put into production. This looks as if an individual material record would have to be set up either in the Purchasing Department or in the Accounting Department, so that the proper adjustments could be made. Personally, I think it is too much work; and if any calculation is to be made, it should be done for the entire order and at the time the order is placed with the vendor.

—Accountant for a corporation supplying light and power
to one of our larger cities.

85. CARBOROUGH SHOE COMPANY

RECORDS OF VARIATIONS BETWEEN ACTUAL AND STANDARD MATERIAL COSTS[1]

The Carborough Shoe Company engaged a new auditor in the spring of 1936. The new auditor spent several months familiarizing himself with the accounting system installed by his predecessor and with the actual operation of the various departments of the factory. As a result of his surveys he was convinced that the accounting system did not provide an adequate basis for measuring departmental efficiency. In order to remedy this condition, he recommended a number of changes in the company's control methods. In his opinion the control records of upper-leather purchasing and cutting were particularly inadequate as a basis for determining the efficiency of these operations. His recommendations, therefore, included provision for a number of additional variation accounts to fix responsibility more definitely in this area.

Upper-leather cutting was an operation requiring considerable skill. Skins contained imperfections, such as scars, cuts, and holes caused by sores, warts, or other injuries; and in the cutting process these defects had to be avoided with as little waste of material as possible. The quality of leather in each skin varied considerably, the finest leather being produced from that part of the skin which covered the back of the animal, and successively coarser leather being made from that covering the shanks, legs, bellies, and shoulders. Vamps and tips were ordinarily cut from the finest portions of the skin, and quarters and foxings from the coarser sections. In order to maintain its standards of quality, the company instructed its cutters to avoid all imperfections and sometimes to discard certain of the coarser sections. At all times, the cutters had to keep in mind the varying quality requirements for different styles and price lines of shoes and to turn out, from the various grades of skins submitted to them for cutting, products conforming to these requirements.

The Carborough Shoe Company used three major types of leather in the uppers of its shoes: kid, calf, and kip. Kidskins were the most difficult to cut since they contained a large percentage of flaws, many of which were not detectable except upon close examination. In order to keep material waste at a minimum, therefore, a large percentage of the kidskins were cut by hand. All calfskins and kips, however, were cut by machine, which was more economical for rapid work. Since the cutting of kidskins required more time and thought than did the cutting of calfskins and kips, the company had found it difficult to set standards of output and speed for the former operation. For this reason, kid cutters were paid day wages whereas calf and kip cutters were paid on a piece rate basis. Piece rates were set at levels which permitted cutters who applied normal effort and skill to earn amounts equal to the earnings of those who were paid day wages.

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[1] See also Harold S. Wonson, "The Application and Uses of Standard Costs in the Shoe Industry," *N.A.C.A. Bulletin*, Nov. 1, 1936, Section I, pp. 255–283.

Prior to the beginning of each production season a committee composed of the president, sales manager, production superintendent, designer, upper-leather buyer, sole-leather buyer, and purchasing officer, who was in charge of procurement of all other materials, decided what styles were to be included in the company's line. For each accepted style a description cost ticket was prepared containing the following information for the standard size shoe (size 8, width 4):

1. Type and grade of materials to be used.
2. Amount required of each material, in square feet per pair or other unit.
3. Labor operations necessary for construction.
4. Standard allowed costs of each item of material and labor required per pair.
5. Standard allowed overhead.
6. Standard allowed total cost.
7. Standard profit allowance.
8. Standard selling price.

In making decisions as to the proper grade of the selected types of leather to be used, the committee considered both the desired quality of the finished shoes and the relative costs of those grades of leather that would give this quality. In determining the relative costs the committee gave due weight to the proportion of necessary waste.

To determine the amount of leather required to cut the uppers, the Carborough Shoe Company (as did its competitors) sent patterns of the standard size of each new style to the Krippendorf

Kalkulating Company, a subsidiary of the United Shoe Machinery Company. By a secret method of calculation the Krippendorf company determined, in square feet per pair, the minimum amount from which the uppers for a given style could be cut, assuming a material with no defects. This amount was known as the No. 1 material allowance for the style. Since all leather contained some imperfections, however, the Krippendorf company also furnished its customers with material allowances No. 2 through No. 10, which allowed for proportionate increases in defects. Thus, the No. 2 material allowance for a given style was approximately 5% greater than No. 1 material allowance; No. 3 was approximately 10% greater than No. 1; and so on progressively, with No. 10 approximately 45% greater than No. 1. It was possible from experience to estimate roughly the proportion of waste that would necessarily result from defects in a selected grade. Thus the selection of the proper grade of upper leather to be used in a given style determined which of the Krippendorf cutting numbers to apply and therefore the standard material allowance for the style.

The current prices per square foot for the selected grades were assigned as the standard allowed unit costs for the entire season. These costs multiplied by the proper material footage allowances gave the standard allowed material cost per pair of uppers for the style for the ensuing season.

After the description cost tickets had been completed, the foreman of the cutting room was furnished with a schedule showing the costs to be allowed per pair for material and the basis upon which they were calculated, that is, the estimated cost of the leather per square foot and a Krippendorf cutting number and its corresponding material allowance in square feet per pair. The Krippendorf cutting number that was given to the foreman of the cutting room was always one classification less than that entered on the description cost ticket. His allowance for cutting, in square feet per pair, was therefore from 3½% to 5% less than that on which standard costs were based. Thus the upper-leather cutting room could exceed its material allowances somewhat without decreasing the standard profit allowances shown on the description cost tickets.

At the beginning of each production season the company estimated the number of pairs of shoes of each style which would be placed in production during that season. After the description cost tickets had been prepared for each style, the total amounts of each type of material required to carry out budgeted production were calculated in a purchase budget. Each day the finished stock department issued a day sheet giving, by styles, sizes, and widths, its requirements for one day two weeks in advance.

A copy of each day sheet was immediately sent to the upper-leather buyer. He was responsible for delivery of leather to the upper-leather cutting department in time to meet the production schedule shown on the day sheets. It was expected by officials of the company that the upper-leather buyer would ordinarily have on hand in the company stock room sufficient leather to cover all day sheets outstanding, or approximately two weeks' supply. The upper-leather buyer was not allowed to accumulate much leather in excess of this amount, however. When in his opinion it was to the company's advantage to make purchases in advance of production as scheduled on the outstanding day sheets, he recommended such procurement to the president of the company. If, after conference with other executives, the president decided that forward purchases were advisable, he specifically authorized the upper-leather buyer to make them. Except when prices were expected to advance rapidly, however, the company's upper-leather inventory was on a day sheet coverage basis.

During the selling season, prices of leather often changed, and the upper-leather buyer found it impossible to buy the grades of leather specified by description cost tickets at the standard allowed unit costs. Also, prices of grades sometimes changed in relation to each other, and it became advisable to alter the grades specified for particular styles. The Carborough Shoe Company had found it advisable, therefore, to give the upper-leather buyer some discretion in deciding what to purchase and what to assign from the stock room on production orders. Thus the upper-leather buyer did not necessarily have to issue, from the stock room, leather of the same values or grades as that called for on the description cost ticket. He could, if he believed it expedient, send to the upper-leather cutting room either cheaper or more expensive material, or a different grade of material than was specified on the ticket. Officials of the company expected that the upper-leather buyer would not depart from standard practice, however, unless there was some real reason for his doing so. He was not required to report discrepancies of this nature or to get specific authorizations for them when, in his opinion, they became advisable.

The company purchased upper leather in lots containing thousands of square feet. Each lot represented a purchase from one tanning company and contained leather of one or more grades at the option of the buyer. There were some differences of opinion among individual tanners as to the limits of the various grades of leather. Leather of a specified grade purchased from one tanner, therefore, might differ considerably in cutting value from leather of the same grade purchased from another tanner. For instance, two skins might be considered to be of the same grade if one possessed a large area of fine leather containing a substantial number of imperfections and the other was composed of a coarser leather with fewer imperfections. Furthermore, although the average cutting value of lots of leather of a given grade purchased from different manufacturers might be approximately the same, the individual skins bought from one manufacturer might be fairly uniform, whereas those purchased from another manufacturer might vary considerably.

The identity of each lot received was maintained in the raw material stock room, and individual lots were never mixed with other lots or subdivided.

When the finished stock department made up its day sheets, it prepared job cards for each style called for. Each job card indicated the number of pairs of each size and width to be produced. After the job cards were made out, they were sent to the cost department. Here an upper-leather cutting sheet was prepared to accompany each job card. On this sheet the proper Krippendorf cutting number, reduced by one, was entered where called for. By means of an automatic calculator, also furnished by the Krippendorf Kalculating Company, it was possible to compute, from the standard material allowance corresponding to the indicated Krippendorf number, total upper-leather allowances in square feet for all sizes and widths called for on the job card. This machine automatically made the proper allowances for variations from the standard size shoe. The computed amount, in square feet, was transferred to the upper-leather cutting sheet and multiplied by the allowed unit leather cost, in cents per square foot, to give the total allowed upper-leather cost for the work called for on the job card.

The job card, together with the upper-leather cutting sheet, was then sent to the upper-leather stock room which was under the jurisdiction of the upper-leather buyer. There, an assistant to the upper-leather buyer directed from what lot the material called for on each upper-leather cutting sheet should be drawn.

On, or immediately prior to, the day on which production was scheduled the approximate amount of material stipulated was measured out and sent, with job card and upper-leather cutting sheet attached, to the upper-leather cutting room. There the leather was assigned to a cutter who knew from experience the approximate quality of the finished product desired. After he had cut the required number of pairs, his work was inspected. Such parts as did not come up to the company's standards were discarded as "cripples." The cutter immediately replaced the rejections in order to satisfy in full the requirements of the job card. A record of the amount of material issued to him for the job and the amount returned was kept on the upper-leather cutting sheet. When better quality skins than those originally established as standard for the style were assigned, cutters customarily used less than the standard footage allowances. When poorer quality skins were used, cutters customarily exceeded the standard footage allowances.

After production had been completed, the job card and upper-leather cutting sheet were routed back to the cost department, where the actual cost of materials used was determined by multiplying the actual footage used by the actual cost per square foot, according to the lot records. Results of the cutting operation were entered in a journal on a form known as the upper-material daily report.

From the upper-material daily report, postings were made to records of individual lots and individual cutters. Thus the company had available for consultation at all times records of the results from each lot purchased and from each cutter's operations. The former enabled the company to determine what sources of supply were most satisfactory. The latter enabled the company to evaluate, to some extent, the relative ability of the individual cutters. Because there were substantial variations in the quality of leather in each lot and sometimes variations in the type of material used from that called for on the description cost sheets, however, it was difficult to determine from the individual record of each cutter exactly what his efficiency was on individual jobs. Exhibit 1 contains records of percentage variations from standard performances by three cutters, all using material from the same lot on different occasions.

EXHIBIT 1
CARBOROUGH SHOE COMPANY
Variations from Assigned* Footage and Dollar Allowances on Random Cuttings from Same Lot of Upper Leather
(Expressed in percentages)

Cutter A		Cutter B		Cutter C	
Dollar	Footage	Dollar	Footage	Dollar	Footage
0.0	0 0	3.1 G	3.1 G	4 0 G	17.3 L
7.1 L	7.1 L	13.9 G	13 9 G	4.4 L	4.4 L
19.8 L	19.8 L	6.0 G	6.0 G	0.5 L	0.5 L
4.0 G	4.0 G	3.5 G	3.5 G		
8.5 L	32.5 L	5 4 L	5 4 L		
18.7 L	18.7 L				
9.3 L	9 3 L				
0.3 G	0 3 G				
2.5 L	2.5 L				

* Assigned to the cutting room.
NOTE: G and L represent percentage gains and losses above or below standard performance.

Throughout the season, weekly, monthly, and cumulative totals of material allowances, material actually used, and variations from allowances, in dollars and feet, were drawn from the upper-material daily report. A record of the dollar totals for upper leather, by six-month periods, is given below.

Period	Actual cost	Allowed cost
July–December, 1934	$245,649	$240,389
January–June, 1935	273,568	274,462
July–December, 1935	271,358	270,420

Although these records indicated that for a period of 18 months there had been no substantial net variations between the actual costs and allowed costs in the upper-leather cutting room, there was upon at least one occasion a substantial variation in one month. In August, 1935, for example, the upper-leather cutting room showed a loss of nearly $4,000 between allowed cost and actual cost. In attempting to fix responsibility for this discrepancy, the president of the company discovered that late in July the plant superintendent had complained to the foreman of the upper-leather cutting room and the three inspectors posted there that quality was not being maintained. As a result the inspectors became more critical and increased the proportion of cripples. Also the foreman instructed the cutters to be more careful in avoiding flaws in their material. As a result of this pressure from two directions the cutters became overconscientious and utilized a much smaller than usual percentage of material. There was, therefore, an accompanying heavy loss.

When apprised of the above facts, the president ordered the plant superintendent to remedy the situation. The latter instructed the inspectors to be more lenient in their rejections. He also told the foreman to supervise more closely the work of the cutters with a view to lowering the percentage of materials unused. Probably because of these measures, the upper-leather cutting room showed a saving of about $1,000 between actual and allowed cost for September. This saving was, of course, in addition to that obtained by the company as a result of its practice of assigning to the upper-leather cutting room lower cutting numbers and material allowances than those shown on the description cost sheets.

The new auditor believed that his predecessor's control methods for purchasing and cutting were inadequate in that they did not indicate the cause of discrepancies from standard. He therefore suggested that substantial additions be made to the existing control mechanisms for measuring the efficiency of upper-leather purchasing and cutting. Among the new control mechanisms which he recommended were a purchase variation account, an application loss and gain account, and a materials loss and gain account.

According to his plan, all variations between standard cost and actual cost of each lot of material purchased would be posted to the purchase variation account. This account would provide for the recording of all variations resulting from the failure of the upper-leather buyer to secure leather at, or below, the standard prices for each grade and would also show savings which occurred when he was able to secure leather at below standard prices. In some instances these variations would be the result of changes in the price level during the season. In others they would measure the ability of the buyer to secure the most favorable terms. The auditor planned that if this account was installed, he would review it frequently to decide the degree to which each of these two factors was responsible for variations.

The application loss and gain account recommended by the auditor would contain a record of all substitutions of one grade for another. The amounts to be posted as debit or credit variations to this account would be differences between the standard cost of the grades actually used and the standard cost of the grades specified on the description cost tickets. The auditor believed that this account would show the degree to which the upper-leather buyer was departing from standard specifications in assigning material for production. When reviewing this account, the auditor expected to take into consideration the fact that changes from standard were sometimes made advisable because of changes in relative price structures among grades.

According to the new plan, material would be charged to the upper-leather cutting room at the standard price per foot specified in the description cost tickets regardless of the price actually paid for the material. Variations in the material loss and gain account thereafter would reflect only the differences between actual footage used and material allowances in the upper-leather cutting room.

The auditor recommended the discontinuance of the practice of assigning to the upper-leather cutting room a lower cutting number than that indicated on the description cost ticket. He recommended that thereafter allowances made to the upper-leather cutting room be based upon standard cutting numbers.

86. MILLDALE PRODUCTS COMPANY

PURCHASING OFFICER'S REPORTS TO MANAGEMENT

The Milldale Products Company, which was located in South Bend, Indiana, manufactured a wide line of metal goods, including tobacco humidors, cocktail shakers, water bottles, and such electrical appliances as irons, percolators, and waffle irons. It was the custom of the purchasing officer, who bought all materials and supplies, to make an annual report to the general manager concerning his activities. Early in December, 1938, the purchasing officer was reviewing the various types of reports he had written, with a view to making such improvements in the presentation as might be desirable.

The purchasing officer bought a wide variety of materials and supplies, most important of which were copper, brass, steel, corrugated boxes, ceramics, resistance wires, bakelite, molded parts, glassware, wood, and porcelain ware. In all, he purchased over 5,000 items and sizes. Of the 400 principal classifications of items purchased, 100 annually amounted to over $7,000 each, while the remaining 300 averaged less than $300 each.

The purchasing officer also had control over inventories of raw materials and supplies; this control he maintained through perpetual inventory records. Since the majority of items were readily obtained and were not regularly carried in stock, they were purchased only in accordance with specific requirements.

In addition to being responsible for purchases and inventories, the purchasing officer participated in executive discussions concerning design and model changes, expansion and contraction of line, and changes in production processes and methods, particularly when alterations of raw material and supply requirements were involved. He frequently investigated such problems on his own initiative and submitted his ideas to the general manager, who was his immediate superior.

In carrying on his procurement activities, the purchasing officer was continually in contact with the general manager through the medium of personal and written discussions. As the general manager had confidence in the purchasing officer's ability, such discussions concerned only matters of purchasing and production policies, not the operation of the department. Aside from reporting any purchasing data which affected a decision on a specific company problem, the purchasing officer had never submitted formal reports to the general manager at regular intervals throughout the year. He had, however, continued the custom of his predecessor of presenting annually a written summary of the work done by his department. The purchasing officer did not know what use the general manager made of these reports; so far as he knew, they had never been used as a basis for a critical analysis of his department's activities.

As his predecessor's assistant, the purchasing officer had participated in preparing reports for the management. These reports had discussed each important classification of items in some detail, particularly showing the savings resulting from purchases below market prices. In the report some effort also was occasionally made to predict future market conditions.

In 1928 the purchasing officer was placed in full charge of purchasing. In the belief that the reports written by his predecessor were unnecessarily long, he decided to submit an entirely different type of report. His reports were brief factual summaries, presenting such information as the number of orders placed, the number of salesmen interviewed, the number of letters written, the total value of purchases made during the year, the number of items bought, and the average value of each order.

Beginning in 1933, the purchasing officer made another change in the type of report which he submitted to the general manager. Such data as the number of orders placed were no longer included, but instead the report compared total purchases of the current year with purchases of the previous year. For the most important classifications of commodities, principally copper, brass, and steel, the report also presented figures showing the price changes that had occurred. In subsequent years, figures for various other classifications of purchases were added, so that by 1938 the purchasing report was again becoming somewhat long. The report as of January, 1938, for the year 1937 is shown in Exhibit 1.

In December, 1938, the purchasing officer was considering what to include in his report to the general manager, as of January, 1939. He had readily available the information necessary to make a report similar to that of the previous year. In addition, he either had or could get information on such matters as the

EXHIBIT 1
MILLDALE PRODUCTS COMPANY
Purchasing Report for 1937
1937 Full Year

	1935	1936	1937
Material and supplies, etc., purchased	$603,434	$752,221	$1,035,838
Metal purchased	133,299	194,667	203,868
Total purchases	$736,733	$946,888	$1,239,706

Metal purchased (pounds)

Month	Steel	Brass	Copper	Aluminum	Nickel silver	Total
January	186,114	20,872	13,622	4,045	...	224,653
February	98,051	14,868	16,102	2,786	8,012	139,819
March	106,537	22,559	14,955	8,124	...	152,175
April	125,980	19,383	7,867	8,384	...	161,614
May	107,928	18,544	11,433	7,114	320	145,339
June	322,749	16,412	19,422	26,329	...	384,912
July	360,687	35,548	25,971	12,458	...	434,664
August	228,484	11,214	3,873	12,971	...	256,542
September	137,679	11,381	218	14,785	3,038	167,101
October	52,238	4,050	17,244	2,592	...	76,124
November	4,872	.	1,669	...	...	6,541
December	20,026	...	405	...	...	20,431
	1,751,345*	174,831	132,781	99,588	11,370	2,169,915

Aluminum (alloy die castings)	269,919
Nickel anodes	20,959
Tin	20,093
Lead	15,181
Antimony and white metals, stainless, etc.	6,790
Total	2,502,857

	1935	1936	1937
Steel purchases in pounds	1,202,904	1,259,416	1,751,345
Copper and brass	300,906	316,316	307,612
All other metals	211,153	244,095	443,900
	1,714,963	1,819,827	2,502,857

* 345,000 pounds of this total are auto-body and cold-rolled seconds.

number of orders placed, salesmen interviewed, invoices passed, and letters written. He knew the costs of operating the department, including such elements as salaries and wages, heat, light and power, postage, and other office expenses. He could describe

Exhibit 1 (*Continued*)
Milldale Products Company

Total metal purchased in 1929, 1,460,804 pounds, of which over 900,000 pounds were copper and brass, and 477,000 were steel
Ratio 1929: 9 copper and brass to 5 steel
1937: 3 copper and brass to 17½ steel

	1935	1936	1937
Coal purchases, net tons	1,422	1,518	1,566
Total cost	$9,164.90	$ 9,005.89	$ 9,302.99
Average cost per net ton	6.45	5.93	5.94
Power and light, kw.-hr		1,160,640	1,450,080
Total cost		$19,769.28	$22,875.23
Average cost per kw.-hr		0.017	0.01578
Gas, cubic feet*		4,978,700	6,455,000
Total cost*		$ 3,116.12	$ 3,782.20
Average cost, per M cubic feet		0.626	0.586
Water, cubic feet		4,806,400	6,907,630
Total cost		$ 3,604.80	$ 5,180.72
Average cost, per C cubic feet		0.075	0.075
Copper			
Ingot price (December 31)†		0.12	0.11
Steel			
Carload price delivered South Bend (November and December respectively)		2.28	3.58
Additional cost of steel for equal quantity purchased in 1937 over 1936 prices (if entire year)			$15,759

Inventory	December 31, 1936	December 31, 1937
Materials and supplies	$61,124.40	$ 96,073.59
Metals only	15,644.24	34,767.00
	$76,768.64	$130,840.59

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* Includes 3,594,740 cubic feet for die casting machine—cost $2,106.52 in 1937.

† Year high, 17 cents; year low, 11 cents (November 23). For changes throughout the year, see page 608.

such reductions in the cost of purchased items as had taken place since the previous year, and had some evidence in regard to savings in purchasing that had resulted from better selection of sources of supply and products to be purchased and from buying in more advantageous quantities.

EXHIBIT 1 (*Continued*)
MILLDALE PRODUCTS COMPANY
Copper, 1937

Month	Quantity received (in pounds)	Price paid (ingot) (in cents)	Market price (in cents)	
January	34,494	9½– 9¾	January 1–11	12
February	38,982	9½– 9¾	February 1–16	14
			20 to end of month	15
March	37,514	9¾–10	March 1–8	16¼
			31	17
April	27,250	9¾–10	April 1–6	16
			16–20	15½
			20–29	14½
			25 to end of month	14
May	30,297	9¾–10	May	14
June	35,834	9¾–10	June	14
July	61,519	9¾–13	July	14
August	14,087	13	August	14
September	14,637	13	September 1–28	14
			28 to end of month	13
October	21,294	13	October 1–26	13
			26 to end of month	12
November	1,669	12	November 1–23	12
			23 to end of month	11
December	405	11	December	11
	317,982			

Note: Ingot price January 1, 1937, is 12 cents with a published base on sheet copper of 17⅞ cents per pound and 17¼ cents per pound for brass; that ingot price of October 26, 1937, is 12 cents with a published base on sheet copper of 18⅝ cents per pound and 18⅛ cents per pound for brass. Also discounts off extras reduced from 50% to 40%, as of September, 1936. This difference to us is ¾ cent per pound additional for copper and ⅞ cent per pound for brass, plus ½ cent a pound additional quantity extras on average order 500–1,000 pounds. Advance in published prices due to labor and other cost increases. Based on same ingot price with present published prices in comparison with published prices about a year ago, change in prices affects us as follows:

133,000 pounds of copper at 1¼ cents additional = $ 1,662.50
175,000 pounds of brass at 1⅜ cents additional = 2,406.25
Addition per year $ 4,068.75

Plus additional cost of circling as compared to about two years ago when it was 2 cents net, while it is now 4.6 cents per pound net (approximately 75% of our requirements are circles):

231,000 pounds at $0.026 = 6,006.00
Total additional per year $10,074.75

Throughout 1938 the purchasing officer had kept for his own information card records of each item purchased. The cards recorded the date of each purchase order, the order number, the quantity actually received, the unit cost, and the total value of the material on hand. For each withdrawal from inventory a note was made of the date, the department to which the material was sent, the quantity removed from stock, and the net balance on hand by both quantity and value. These cards also recorded the standard cost of each item. The Milldale company had

Exhibit 1 (*Continued*)
Milldale Products Company
Major Supplies, Only, Used in 1937*

Department	Used	Article	Price	Total
21	261	#628 brushes	$16.50 dozen	$ 358.88
21	None	#4454 brushes		
21	3,640 pounds	Caustic soda (powdered)	4.05 C	147.42
4	3,045 pounds	Caustic soda (flake)	3.30 C	100.49
21	39,048 pounds	Soda ash	2.25 C	878.58
21	37,325 pounds	Trisodium phosphate	2.79 C	1,041.37
21	1,844 pounds	Sodium silicate	0.055 pound	101.42
21	868 pounds	Rosin	0.09 pound	78.12
21	5,775 pounds	Sodium perborate	0.15¼ pound	880.69
21	7,800 pounds	Cyanide	0.165 pound	1,287.00
21	237 pair	Rubber gloves	15.12 dozen pair	298.62
21	1,520 pounds	Chip soap	0.09⅝ pound	146.30
21 and 24	1,628	10-inch sewed buffs	234.70 M	382.09
24	10,750	8-inch bias buffs	28.46 C	3,059.45
24	8,000 pounds	Buffing compound	0.06 pound	480.00
21–24	2,100	6-inch loose buffs	95.67 M	200.91
12–24	36,964 pounds	Trulime	0.095 pound	3,511.58
17	695 pounds	Glycerin	0.275 pound	191.13
11–21	239	Sponges	0.125 each	29.88
15–33	2,952 rolls	2-inch gummed tape	0.23 roll	678.96
All	87	Brooms	7.60 dozen	55.10
21	29,800 pounds	Chromic acid	0.15¾ pound	4,693.50
7	2,400 pounds	#100 abrasive	0.10¾ pound	258.00
7	2,200 pounds	#100 emery	0.07 pound	154.00
Total	....	....	....	$41,001.20

* Partial list only. Total, however, is actual figure.

operated a standard cost system until 1933. In 1938 the standard cost of each item was still entered on the cards, but, as the standards had not been revised, actual purchase costs exceeded standard by about 12%.

To aid him in planning the company's financial requirements with the treasurer, the purchasing officer drew up a monthly statement of the company's purchase commitments, in the form shown in Exhibit 2. Since metals were the most important single classification of commodity purchased, he maintained a record of monthly metal receipts, as shown in Exhibit 3. The purpose of this record was to furnish indications of factory activity for the immediate future. Since metals were the basic materials

EXHIBIT 2
MILLDALE PRODUCTS COMPANY
Monthly Purchase Commitments, 1938

Month	Purchases placed		Commitment, first of month		Commitment, end of month	
	Materials and supplies	Metal	Materials and supplies	Metal	Materials and supplies	Metal
January	$86,387	$ 9,423	$134,380	$18,508	$126,276	$ 9,585
February	35,759	6,966	126,276	9,585	88,983	10,150
March	45,029	11,480	88,983	10,150	82,766	12,424
April	40,226	3,464	82,766	12,424	85,201	5,988
May	22,368	3,076	85,201	5,988	78,713	5,280
June	38,713	2,824	78,713	5,280	90,825	4,483
July	21,273		90,823	4,483	90,716	3,967
August	57,070	9,126	90,716	3,962	78,059	7,523
September	44,914	4,181	78,059	7,523	72,451	4,887
October	46,612	9,891	72,451	4,887	52,454	10,617

EXHIBIT 3
MILLDALE PRODUCTS COMPANY
Metal Received Monthly, 1938
(In pounds)

Month	Aluminum	Brass	Copper	Steel	Nickel silver	Aluminum die casting alloy	Lead
January	1,382	16,624	3,543	250,218	......	43,416	
February	2,718	2,267	....	98,054	1,954		
March	9,642	9,237	3,123	28,545	100	40,845	
April	1,148	5,468	10,453	81,325	......	40,069	102
May	855	3,293	287	23,399			
June	4,298	4,083	3,783	16,136			
July	2,883	12,196	1,612	6,144	......	20,000	2,041
August	2,938	5,013	1,905	25,023	......	20,056	
September	2,582	12,087	8,412	49,368	96		
October	3,040	626	.....	29,621			

from which the products were started, and since practically all metal was bought for specific production requirements, the purchasing officer believed that the receipts of such materials indicated the extent of factory activity in the future. An estimate then could be made of approximately how heavily to buy all other materials and supplies that were not bought for specific requirements but rather controlled from a general knowledge of factory operation. If large quantities of metals were received, high

EXHIBIT 4
MILLDALE PRODUCTS COMPANY
Record of Price Changes for Copper, Brass, and Steel, 1938

Month	Copper and brass	Steel
January:		
(November 23 to January 20)	11 cents	
(January 20–28)	10½ cents	$ 3.58 carload delivered
(January 28 to end of month)	10 cents	
February	10 cents	3.58 carload delivered
March	10 cents	3.58 carload delivered
April	10 cents	3.58 carload delivered
May:		
(May 20–June 1)	9 cents	3.58 carload delivered*
June:		
(June 25)	9 cents	3.33 carload delivered†
July:		
(July 1) Contracted for 50,000–60,000 pounds at	9 cents	3 33 carload delivered
(July 1)	9½ cents	
(July 5)	9¾ cents	
(July 25)	10 cents	
(July 29)	10⅛ cents	
August:		
Buying on July 1 contract	10⅛ cents	3 33 carload delivered
September:		
Buying on July 1 contract		
(September 14)	10¼ cents	
(September 19)	10⅜ (brass + ⅛ cent)	3.33 carload delivered
October:		
Buying on July 1 contract		
(October 5)	10½ cents	
(October 6)	10⅝ cents	
(October 10)	10¾ cents	
(October 11)	...	3.14 carload delivered
(October 13)	11 cents	
(October 14)	11¼ cents	
(October 17)	...	3.04 carload delivered‡
(October 19)	...	3.33 carload delivered

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* To May 24. May 24 drop $2 per ton. Base $3.48 carload delivered effective on all shipments on or after May 24 regardless of order dates.

† New basing points, total drop in a month, $5 per ton.

‡ All unshipped orders to be billed at lower prices.

activity was expected to follow; if small quantities of metals, low activity. Metal purchases, therefore, acted as a barometer of factory activity and helped to keep all items in the proper balance.

Because prices of brass aud copper fluctuated widely, the purchasing officer prepared for his own information the type of price record shown in Exhibit 4. Prices of steel were also shown, as this commodity was the most important item purchased.

EXHIBIT 5

MILLDALE PRODUCTS COMPANY

Monthly Statement of Major Supplies Used, May, 1938*

From January 1 to February 28 we used $6,151.76 worth of major supplies.

For the month of March we used $2,702.43; April, $1,303.29; May, $1,236.13.

As explained before, careful use of supplies is very desirable because of our falling off in production and also because of business conditions.

Our production for April was $139,303.31; for May, $98,060.51; therefore our supplies did not decrease enough in proportion to decrease in production.

Department	Used	Article	Price	Total
21	24	#628 brushes	$ 16.50 dozen	$ 33.00
21	None	#4454 brushes	13.00 dozen	
21	100 pounds	Caustic soda (powdered)	4.05 C	4.05
4	None	Caustic soda (flake)	3.30 C	
21	1200 pounds	Soda ash	2.25 C	27.00
21	1300 pounds	Trisodium phosphate	2.79 C	36.27
21	25 pounds	Sodium silicate	0.055 pound	1.38
21	25 pounds	Rosin	0.09 pound	2.25
21	None	Sodium perborate	0.13¼ pound	
21	200 pounds	Cyanide	0.14 pound	28.00
21	None	Rubber gloves	15.12 dozen	
21	160 pounds	Chip soap	0.08⅜ pound	13.40
21-24	50	10-inch sewed buffs	209.00 M	10.45
11-12	100	8-inch bias buffs	27.04 C	27.04
21-24	100	6-inch loose buffs	87.90 M	8.79
24- 3	700 pounds	Trulime lime finish	0.095 pound	66.50
17	None	Glycerin	0.275 pound	
11-21	2	Sponges	0.125 each	0.25
15-33	118 rolls	2-inch gummed tape	0.22 roll	25.96
All	1	Brooms	7.60 dozen	0.63
21	1,000	Chromic acid	0.15¾ pound	157.50
Total....	....	....	....	$1,236.13

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* Partial list only. Total, however, is actual figure.

Purchases of major supplies did not amount to a large proportion of total purchases, but because so many items were involved the purchasing officer issued, for use by his own department, the general manager, and factory executives, a monthly statement of the major supplies used. An example of this report is shown in Exhibit 5. The purchasing officer believed such a statement facilitated the control of the quantities used by the various departments.

In addition to raw materials and supplies, the purchasing officer purchased electric power, water, coal, and gas. He maintained a monthly record of such purchases, as shown by the example given in Exhibit 6, in order to compare consumption with production volume.

EXHIBIT 6
MILLDALE PRODUCTS COMPANY
Monthly Record of Power Purchased, 11 Months in 1938

Month	Kw.-hr.	Cost per kw.-hr.	Total cost
January	77,760	$0.02030	$1,578.53
February	118,880	0.016	1,102.08
March	97,920	0.0176	1,723.39
April	70,500	0.02	1,410.00
May	70,500	0.0197	1,388.85
June	59,040	0.0218	1,287.07
July	36,000	0.0317	1,141.20
August	79,200	0.0186	1,473.12
September	72,000	0.0193	1,389.60
October	73,400	0.0191	1,401.94
November	79,200	0.0181	1,433.52

As inventory control was also under his supervision, the purchasing officer closely watched the quantities of raw materials and supplies in order to avoid excessive stocks. He received monthly from the accounting department a statement of the total value of the raw materials and supplies in inventories. Approximate figures for the first 11 months of 1938 are given in Exhibit 7, as well as sales figures for the corresponding months.

EXHIBIT 7
MILLDALE PRODUCTS COMPANY
Monthly Inventories and Sales, 11 Months in 1938

Month	Inventory (as of first of month)	Sales
January	$130,840	$117,000
February	180,000	137,000
March	180,000	111,000
April	160,000	76,000
May	160,000	75,000
June	160,000	77,000
July	160,000	118,000
August	100,000	210,000
September	200,000	203,000
October	180,000	223,000
November	150,000	244,000

87. GRIMTON COMPANY

IMPROVING THE EFFICIENCY OF PURCHASING

The Grimton Company converted cotton into staple grey goods and specialties for household and hospital use. The company consisted of 17 widely scattered manufacturing units grouped into 4 general divisions. Each division was a complete unit in that it was managed by a separate general manager, production manager, sales manager, and purchasing officer. In addition to these division officers, the Grimton Company had a central administrative board acting for the most part in an advisory capacity. Purchasing was represented on this administrative body by a staff purchasing officer. Early in 1938 the staff purchasing officer was considering methods of determining the efficiency with which purchasing was being conducted, for the purpose of eliminating weaknesses and improving the usefulness of the purchasing department to the company as a whole.

The duties of the staff purchasing official were, first, to cooperate with each division of the Grimton Company in an advisory capacity on all matters pertaining to purchasing, particularly in matters of policy; second, to make all contractual agreements with suppliers for materials used by two or more divisions of the Grimton Company; and, third, to supervise the activities of the four divisional purchasing officers in the purchase of noncontract items.

Except for cotton, which was purchased through brokers, all purchases of materials and supplies used in the manufacture of the Grimton Company's products were made by the divisional purchasing departments. Purchases of the largest division were in excess of $1,808,000 a year; purchases of the three others ranged from $339,000 to $791,000 each. Purchases were made by a division following the receipt of requisitions from an operating department or from the divisional balance of stores department, which was in charge of perpetual inventory records. The order points and amounts to order which were shown on these records were determined by the divisional purchasing officer and the head of the divisional balance of stores department. All policies in regard to the quantities to be purchased in advance of requirements, however, were set by the general manager of the Grimton Company, to whom the staff purchasing officer, as the occasion arose, submitted written memoranda suggesting such changes in purchasing policies as he believed were necessary.

Total annual purchases of the Grimton Company in 1937 amounted to $4,160,400, about 50% of which was against annual contracts with suppliers. Under these annual contracts the suppliers agreed to furnish the company's needs for certain materials throughout the year at times and in amounts to be indicated later by the Grimton Company. Normally, however, such a supplier expected to receive orders in each quarter for about 25% of the Grimton Company's total annual consumption of his particular product. About half of these contracts were "group" purchases involving materials which were used in more than one division. If the contract involved a group purchase, the staff purchasing officer usually made contacts with the supplier personally, but all contracts were negotiated through the collaboration of the staff purchasing officer and the divisional officials concerned. Each division could order its needs directly from a supplier with whom the company had a contract.

The prices stipulated in the contracts were considered by the purchasing officer to be very favorable to the company; if at any time during the life of the contract, moreover, the Grimton Company received from an acceptable supplier a quotation lower than the contract price, the contract supplier agreed to reduce the price indicated on the contract in accordance with his competitor's quotation. This new price was then in effect for the remainder of the life of the contract. In a few instances in which extreme price increases had occurred subsequently to the date of the contract, the Grimton Company had agreed to accept some increase in contract prices rather than cause severe hardship to its supplier. Such instances, however, were extremely infrequent.

Contracts that involved only one division were similar in nature to those providing for group purchases. Usually contracts continued in force for one year, but a few contracts were made for two or three years. If the material being purchased was for the use of only one division, the divisional purchasing officer usually carried through the actual negotiations with the advice of the staff purchasing officer. The final contract, however, had to bear the latter's signature.

Noncontract items were purchased directly by the purchasing officers of each division, who were given the power to select the suppliers and place the orders without referring to the central office.

The staff purchasing officer maintained his control over the operations of the divisional purchasing officers through four types of reports:

1. Divisional accomplishment report.
2. Purchasing report.
3. Budget report.
4. Administrative cost report.

The divisional accomplishment reports, upon which the general purchasing report for any one year was based, were prepared quarterly by the divisional purchasing officers. These accomplishment reports not only were the source of information for making up the next annual purchasing report, but also contained the divisional officers' replies to suggestions and criticisms made by the staff purchasing officer in previous purchasing reports. The accomplishment reports gave the staff purchasing officer an opportunity to study the operations of the purchasing department at each division. They presented total purchases by items, classified in accordance with the system previously discussed, and grouped according to contracts signed, contracts pending, and noncontract items. Total purchases and prices paid during the previous year were given. Recent increases or decreases in prices currently being paid were indicated with changes since the last annual purchasing report, given both in percentage and in dollars.

Each divisional purchasing officer then discussed in his accomplishment report the most important items, such as changes in suppliers, the price changes which he predicted, and ways of improving the work of his department. In this way he attempted to acknowledge sources of improvement before it was necessary for the staff purchasing officer to suggest them to him. An equally important part of the accomplishment report was the section in which the divisional purchasing officer reported on his progress in incorporating into the work of his department the suggestions and criticisms made in the previous annual purchasing report. If he had not completed the changes necessary to satisfy the suggestion or criticism, he indicated when he was going to attack the problem. If he disagreed with the staff purchasing officer's analysis, he usually discussed the matter personally during the staff officer's semiannual trip to his division.

The second type of report was the purchasing report, which was based upon the information given in the accomplishment report. The purchasing report, copies of which were sent to the divisional purchasing officials, was made in December by the staff purchasing officer for the information of all company executives who might be interested. The purchasing report for 1937 consisted of two parts. The first part presented a summary of the purchasing department's activities in 1937 and what the department hoped to do during the coming year; and the second gave in more detail the estimated raw material costs for 1938. The first part of the report was presented in the following form:

SUMMARY
1937 Purchases and 1938 Objectives

Division	Total purchases 1937	Estimated change 1938	
		Less	More
A	$2,170,130	$45,584	
B	645,010	1,967	
C	965,160	13,601	
D	380,100		$567
Totals	$4,160,400	$61,152	$567
Net Decrease		60,585	

In the first column were listed the four main divisions of the Grimton Company; in the second column, total dollar purchases of each division during the preceding year; and in the third column, the estimated net increase or decrease in cost of raw materials during the coming year if the physical volume of purchases remained the same as in the previous year. In its reports the purchasing department made no effort to estimate volume of purchases required for the ensuing year as it believed this factor was completely out of its control.

The second part of the 1937 report to the company management presented detailed figures on purchasing in each division. These figures were derived from accomplishment reports prepared quarterly by the divisional purchasing officers. Items were listed by approximately 100 classifications and were grouped under the headings, "Items under Contract," "Contracts Pending," and "Non-contract Items." The 1937 report of the largest division of the Grimton Company, Division A, may be used as an example. Under the heading, "Items under Contract," this report presented approximately 57 classifications, including such packaging supply items as folding cartons, corrugated cartons, glassine envelopes, and collapsible tubes; such raw materials as zinc oxide, glycerin, paraformaldehyde, alcohol, sulphur, caustic soda, chlorine gas, sulphuric acid, oxalic acid, and barium chloride; and such semifinished materials as elastics and narrow fabrics. These classifications were listed in order of total cost of the year's purchases. The 10 largest classifications comprised approximately 60% of the dollar purchases which Division A made under contract. Contract purchases of Division A in 1937 amounted to $675,000. This section of the report also gave, for each classification, the expiration date of the contract, exact dollar volume of 1937 purchases, the estimated percentage change in unit prices during 1938 as compared with 1937, and the net difference in dollars if purchases of each classification in 1938 continued in the same volume as in 1937. For items already under contract the staff purchasing officer estimated that the net savings during 1938 over 1937 would be $24,905.

A similar analysis was made in the Division A report for those items for which contracts were pending but not yet signed. As in the section for "Items Under Contract," these items were listed according to purchase volume, with figures for 1937 purchases, the estimated percentage change in unit prices during 1938 as compared with 1937, and the net difference in cost if purchase volume continued the same in 1938 as in 1937. For this class of commodities the purchasing department estimated a saving in 1938 of about $11,300 on purchases which in 1937 had amounted to $226,450.

Noncontract items, such as catgut, general printing, maintenance and building supplies, new factory equipment, office supplies, coal, electros, zinc, and tabulating rentals were also ranked in order of importance. The value of purchases of these items made by Division A during 1937 was given, along with the percentage increase or decrease in unit prices and the net dollar change estimated for 1938 as against 1937. Purchases of these noncontract items in 1937 amounted to $1,268,680, and the purchasing department estimated a saving of $9,379 in 1938. There were 25 items listed as purchased without contracts, of which the 10 most important were [illegible]d to involve almost 70% of the total volume of noncontract purchases made by Division A.

After this statistical analysis had been made, it was customary for the staff purchasing officer to make certain suggestions which he believed would improve the purchasing efficiency of the division. Study of the 1937 report convinced him that although the purchasing department at Division A had done excellent work, it still might find ways in which to attain savings through increased efficiency. Realizing that a study of its operations could be made by the department only at the expense of time required for the regular purchasing routine, the staff purchasing officer suggested three areas in which economy of time might be effected:

1. Fewer changes in style, color, shape, or size of product purchased. Many of these changes arose from changes in the division's package design.
2. Fewer interruptions from outside departments which asked for service or information. The staff purchasing officer recognized that the very existence of these departments, such as cost, sales, accounting, products, and methods, many of which were relatively new to the company, created additional work for the purchasing department. Since the purchasing department's function was to render service to the whole division, he did not propose to discontinue assistance to other departments but did wish to reduce the number of interruptions.
3. Reduction in the time spent in interviewing salesmen. Although the staff purchasing officer listed this as one area of saving, his observation of Division A's purchasing activities had led him to believe that the highest efficiency in this part of the work had already been attained, and that little time could be saved from that spent in interviews with salesmen.

The staff purchasing officer's conclusion was that any saving in time for this divisional department could come about only through a change outside the department.

The purchasing department of Division A was the best organized of the four divisional offices which the Grimton Company maintained. Another division, which purchased about one-third as much as Division A and contained some newly acquired manufacturing units, was not so well organized and did not operate with comparable efficiency. In the report on this division the staff purchasing officer made many criticisms and suggestions. For example, expenditures for loom parts, which composed the largest single item bought by this division, were estimated to increase about 2% during 1938. The staff purchasing officer suggested that an exhaustive study be made to determine the proper method of purchasing these maintenance supplies. He suggested that the 10 most important types of parts purchased each year be analyzed to see if the current source was the best available and if, by cooperation with this source and other suppliers, it might be possible to improve the parts in such a way that their service life could be extended. This same divisional report showed an estimated increase of from 9% to 10% in expenditures for check straps and forms in 1938. The staff purchasing officer questioned this increase as hide prices were the lowest since 1929. No other division had shown an equal increase, but, on the contrary, each had predicted small declines. Since loom parts, check straps, and forms were purchased under contract, the staff purchasing officer suggested that an investigation was in order before the contracts were renewed.

Another criticism which the staff purchasing officer sometimes made in these divisional reports arose from inadequate classification of items. For example, one division reported a product classification, "Miscellaneous Supplies and Materials," involving purchases of over $200,000. The staff purchasing officer suggested that this miscellaneous group be studied and reclassified in greater detail, in order to enable both the staff purchasing officer and the divisional purchasing officer to make a more accurate study of prices and suppliers.

The third type of report on which the staff purchasing officer based his control was the purchase budget. This budget considered only unit prices for all items purchased by the department. In setting up the budget, the staff and divisional purchasing executives estimated what the unit prices for each item would be during the coming year. Since negotiations for renewal of contracts were usually consummated during August and September and the budget was made up in November and December, the purchasing department knew the maximum unit costs for about half the company's total purchases of materials and supplies.

Estimated unit prices for the balance of the purchases were based largely on the most recent prices which the company had been quoted or had paid for each class of material. These estimates of unit costs were in all cases referred to the cost department for appraisal and use in setting production budgets.

The purchase budget was the accepted standard to which purchasing at each division was expected to conform. Quarterly each divisional purchasing executive reported to the staff purchasing officer the unit prices of all materials which he purchased, both contract and noncontract. Changes either above or below the standard set by the purchase budget had to be explained to the satisfaction of the staff purchasing officer. He believed that, since production and sales volume were not subject to control by the purchasing department, it was essential that only unit costs be considered in setting a standard for divisional purchasing.

In setting the purchase budget and in planning the future objectives of his department as given in the purchasing report, the staff purchasing officer endeavored conscientiously to avoid setting prices too high and thereby showing unduly favorable results for his department's activities. He attempted each year so to plan his work during the next period that purchasing savings would result. In 1937, after exhaustive analysis, he planned to save $50,000 no matter what the trend in prices or the volume of purchases. This saving was to result from selecting for study items which appeared to be fruitful sources of savings.

For example, in November, 1937, the staff purchasing officer investigated his department's purchases of elastic bandages. He selected this item because he noted that it was purchased from only one source, and also because the item had first been adopted hastily in accordance with the request of the sales department. After his investigation he found that a slight change in material specifications would enable the Grimton Company to buy from a number of sources of supply. Interviewing these manufacturers revealed that the company had been paying an excessively high price for the elastic fabric from which the bandages were made. In addition, the product of its current supplier was found to be unsatisfactory, as it tended to shrink excessively in laundering. This investigation by the purchasing department resulted in a saving of $5,000 in raw material expense, and in addition virtually eliminated returns from customers, which at one time had amounted to 25% of sales.

The fourth type of report, used for control purposes, was the administrative cost report, which took into consideration the administrative expenses of the purchasing department. Annually the staff purchasing officer made up an administrative budget in which he and the divisional officers estimated the cost of conducting purchasing[1] both for the company as a whole and for each division. Included in these estimates were salaries, clerical expenses, office supplies, office equipment (depreciation on office equipment and furniture), heat, light, and power, and traveling expenses. Quarterly each division reported its success or failure in keeping its administrative expenses within this budget. During the first quarter of 1938 the administrative costs for each division were as follows:

Division	
A	$0.008 per dollar purchased
B	0.034
C	0.012
D	0.019

Although the report showed wide discrepancies between divisions, the general purchasing officer was convinced that administrative costs were satisfactory. He explained the unusually high figure for Division B by the fact that the purchasing organization of this division temporarily was overly large in anticipation of the company's acquiring additional manufacturing units that would be incorporated into this division. Discrepancies in the three other divisions were explained largely by differences in demands made upon divisional purchasing officers. During a given year, certain divisional officers might be forced to buy an abnormal amount of repair parts and equipment which entailed much expensive investigation on their part. In some divisions it was necessary for the purchasing officer to buy premiums and display materials for sales contests. In one division the purchasing officer was forced to buy under conditions of relatively unstable sales and production volume. For example, sales of one item following an advertising campaign jumped 700% in a week, forcing abnormal purchasing conditions upon the local officer.

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[1] For actual costs of conducting purchases for the years 1933 to 1937 see Exhibit 1.

In addition to these reports the staff purchasing officer achieved control of the divisional purchasing operations through personal calls at the divisional offices. Usually he planned to visit each divisional office only twice a year, but if the reports mentioned above indicated any particular lack of success in a certain divisional office, such calls might be made more frequently. When he made these semiannual calls, the staff purchasing officer examined division officials' procedures and methods of conducting purchasing, with particular emphasis upon suppliers and the prices paid. In addition, he examined the quality of the materials being purchased, analyzing the number of rejections of materials and complaints by the production department to see if a different quality of materials or a different supplier would result in savings to the company. He also checked specifications given on purchase orders for accuracy and clarity.

EXHIBIT 1

GRIMTON COMPANY

Purchases and Purchasing Department Expense

1933–1937

	1933	1934	1935	1936	1937	Change from 1936
Purchases (exclusive of advertising).........	$2,449,809	$2,803,662	$2,720,356	$3,547,991	$4,160,400	+17.3 %
Purchasing department expense.........	$ 17,063	$ 18,025	$ 22,782	$ 23,829	$ 25,558	+ 7.3
Purchase cost per dollar spent..............	$ .007	$ .0064	$ .00837	$ .00671	$ .00614	− 8.5
Number of invoices passed..............	17,439	21,506	18,190	22,881	22,751	− 0.57
Number of orders written..................	13,413	17,300	14,759	17,106	15,996	− 6 5
Cost per order written..	$ 1 272	$ 1.042	$ 1.544	$ 1 393	$ 1 598	+14.7
Average value of order..	$ 183*	$ 162*	$ 184*	$ 207*	$ 260*	+25 6

* Purchases over orders written.

The staff purchasing officer had no reason to believe that his department was not operating efficiently. His periodic surveys of the prices being paid by the company had led him to think the company was obtaining the lowest possible prices. In addition, he knew from his contact with salesmen and purchasing officers that the Grimton Company had the reputation of buying favorably. He was certain, however, that any business organization could be improved.

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